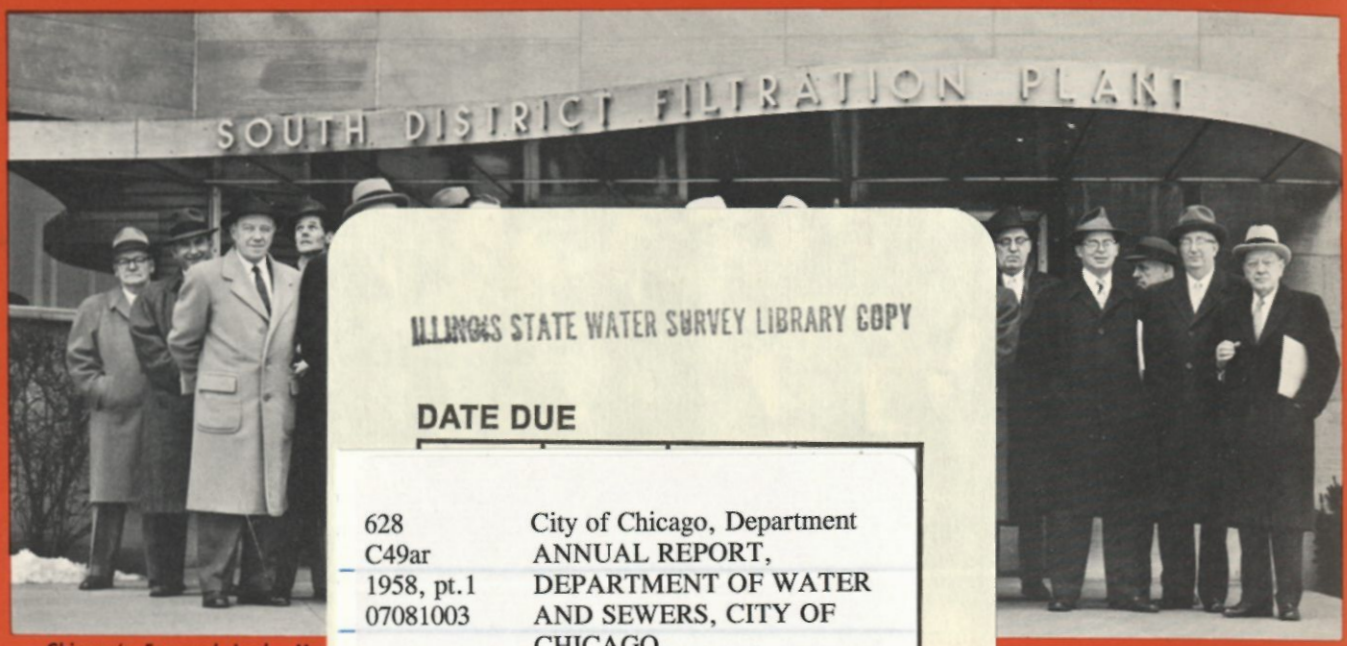
ANNUAL REPORT

1958

DEPARTMENT OF WATER AND SEWERS

CITY OF CHICAGO . . . RICHARD J. DALEY, mayor



Chicago's Forward Look: May confer on water utility progre

inimum. We must take first orts on services which are ealthiest, best protected and Daley, Mayor.

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The Honorable Richard J. Daley, Mayor
The Honorable Members of the City Council
City of Chicago, Illinois

Gentlemen:

In 1958, the Department of Water and Sewers carried programs calculated to help make the people of Chicago the "healthiest in the nation." This report describes, briefly and pictorially, those programs. They are described in a form which we believe may be readily understood by the public and others who may be interested in Chicago's water and sewer services—both so vital to the life and welfare of Chicago's citizens.

Two separate technical supplements to this report have been prepared, one describing the activities of the Bureau of Water, the other describing the activities of the Bureau of Sewers. Both may be had upon request.

In 1958, 367.26 billion gallons of water were pumped to users, 30.3 miles of mains were constructed in the distribution system more than 50 miles of sewers were added, the City began a new Five Year capital improvement Plan, and its programs for water purification received national recognition. In addition, the Water Works System continued the modernization of its pumping stations and plans were being finalized for a new Southwest Side pumping station that will eventually increase pumping capacity by 275 million gallons a day. Total revenues for the year amounted to $41,288,292.

The employees of the Department performed effectively all during the year and, as a result, no unusual incidents were encountered that hampered the vast City water and sewer systems from operating at optimum capacity. We wish to publicly express our appreciation to the employees for a job well done.

Further, we wish to thank the other agencies of government, industrial groups, craftsmen, and above all the people of Chicago for the fine co-operation and assistance which they have given this Department since it was created on January 1, 1953.

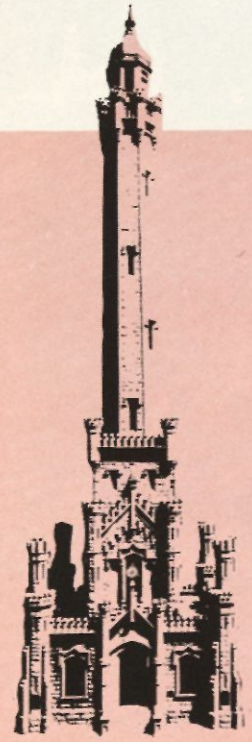
And finally, Mr. Mayor, we wish to thank you and the City Council for your continued guidance and support. It has made possible the progress of this Department in meeting the needs for adequate sanitation and water services of a growing metropolis. With your continued support, we believe Chicago will continue to rank among the foremost cities of America in the field of supplying these services to the people.

Respectfully submitted,

JAMES W. JARDINE

Commissioner of Water and Sewers

CONTENTS

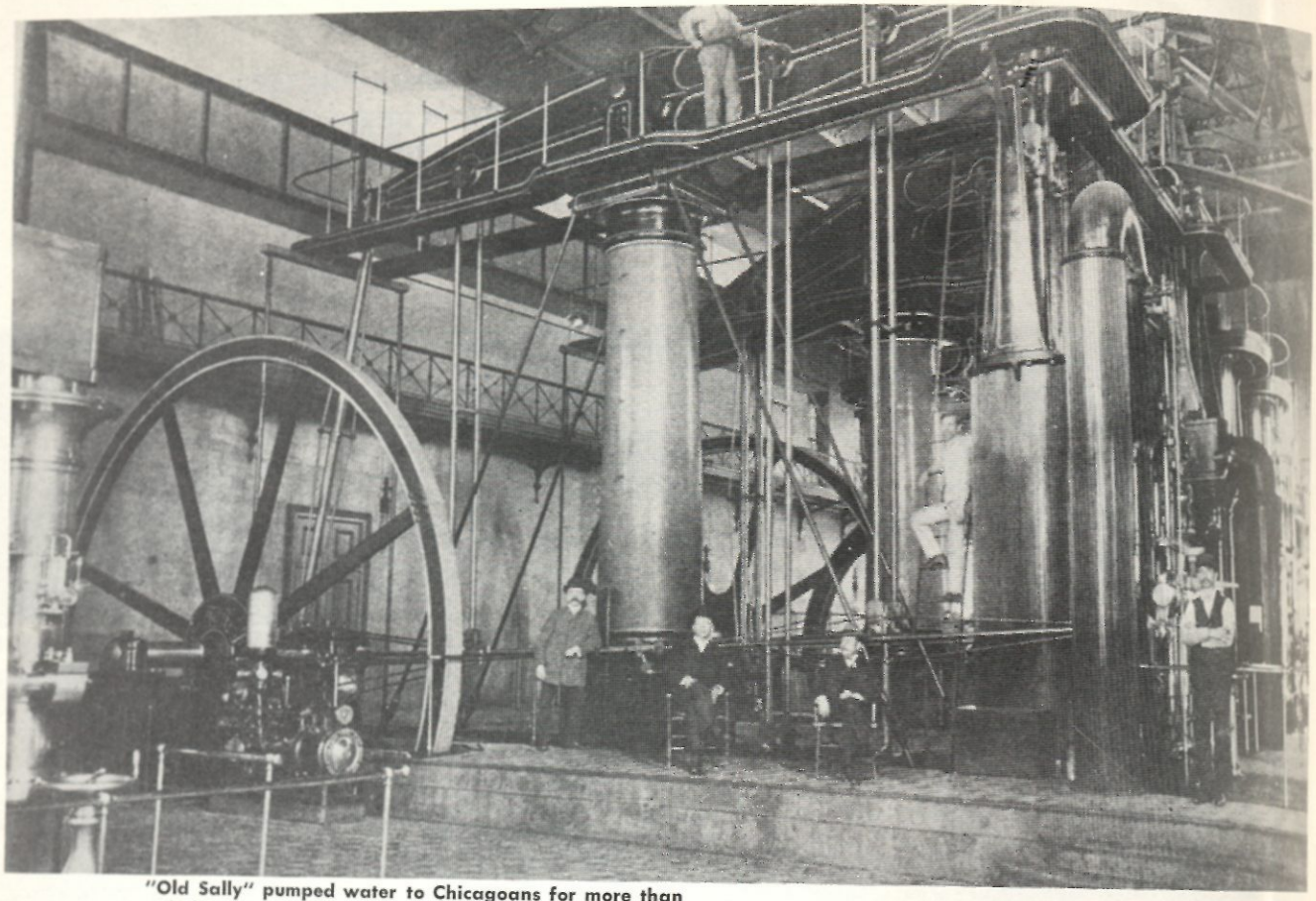


The Water Tower — At the intersection of Michigan and Chicago Avenues on a small plot of unprepossessing park rise the 154-foot-high battlements of the Old Water Tower. Although its saw-toothed towers were designed in 1869 by Architect William W. Boyington to recapture the romance of a medieval castle, the kind from which archers and cross-bowman defended themselves from attack, its peaceful cupola today is a sanctuary for birds, and its pale yellow-white exterior, of rare, hand-hewn Lemont limestone, lends it an air of charm and tranquility.

While its octagonal form incorporates Gothic architectural elements that might have been a cheerful sight to Richard the Lion Hearted, its slender tower, crowned by wide windows and a balcony, have an almost minaret-like quality that would not be out of place among the mosques of Mecca.

Built to conceal a 138-foot-high standpipe—then used to help keep water flowing evenly—Boyington saw the Tower as a vision of contrasting cultures and ages. And from the Gothic, the Moslem, the Tudor, and the styles of his own time, he fashioned a structure of classical symmetry. He did another thing to make the tower imperishable: he built it of fireproof stone. Thus, only two years after its construction, on the morning of October 9, 1871, when the Chicago Fire had leveled very nearly every other building within miles and ravaged the pumping station across the street, (it left the city without water for eight days,) the Tower emerged unscarred.

On the day after the Fire, the Water Tower was more than merely a guidepost by which the citizenry hunted for the ruins of what had once been their homes. It had become, overnight, (in addition to being a monument to the efforts of Chicago's waterworks engineers,) a memorial to the great Fire's victims and the symbol of a city's indestructible will to endure.



"Old Sally" pumped water to Chicagoans for more than a half century. It was removed from service in 1904.

SHORTLY after three o'clock on the afternoon of October 31, 1866, a gangling, bush-bearded engineer, his hair tossed by a steady wind off Lake Michigan, stood at the foot of a shaft that plummeted 60 feet down near the Chicago Avenue pumping station, and prepared to descend.

Mobbed by press photographers, reporters, City Fathers, and well-wishers, he was also viewed by a number of curious but skeptical spectators who doubted whether his fantastic project would ever do anything successfully — except perhaps drown his workmen and mules under a mountain of water like Pharaoh's Army.

For two years, seven months, fourteen days, and approximately five hours, two work gangs had poured coolie-effort into the planner's project. Now he was going down to see the result.

Pits and Poison Gas

At that moment, midway between the pumping station and the new Two Mile Crib, the tired gangs of black-faced workmen, knee deep in clay, muck, and water, waited for Ellis Sylvester Chesbrough to officially break through the thin wall of earth that separated them, and complete what the press hailed as "the most gigantic engineering scheme of the century."

As the skeptics looked on with raised eyebrows, City Engineer Chesbrough, accompanied by his assistant, a Mr. Clark, and a retinue of reporters, disappeared from sight on one of the momentous journeys of modern times. Chesbrough, however, was confident no harm would befall the work gangs — one of which had burrowed west from the crib, the other east from the shore — often chopping their way through barriers of boulders.

The Egyptian Darkness

Purpose of Chesbrough's tunnel: to supply 57 gallons of crystal clear drinking water to each of 240,000 Chicagoans each day. Of his journey, the Chicago *Republican* wrote:

"Mr. Chesbrough and his party were conveyed in small wooden cars which had been used for carrying out earth while the excavation was going on. These curious contrivances are about four feet long by two and a half wide. Several of them were fastened together and propelled by a mule.

"The glare of lights amid the Egyptian darkness, the swarthy faces of the workmen, the gratified countenance of the engineer and the complete novelty of the entire situation made the scene one long to be remembered by all who took this strange subterranean journey.

"The sensations during so novel a ride can scarcely be described. They arrived at the only remaining obstruction, the earthen wall, a few blows sufficed to make the connection complete, and when Mr. Chesbrough shook hands with the contractor through the newly-opened space, an involuntary rousing cheer went up from all hands. Every one felt how great a task had been completed, and joy shone on every face.

The Timid Adventurer

"Three rousing cheers were given for the engineer. Afterwards, the entire party started for shore. During the passage no sound breaks the silence save that of those immediately present. The vast lake above them, with its restless waters, maintains the silence of the grave, while the timid adventurer, mayhap, indulged in an occasional gloomy reflection at the possibility of this resistless mass breaking through the barriers which restrain it, hopelessly burying him beneath the flood.

A Success For All Time

"While these fears are inevitable with some, they are practically groundless. These first explorers of the great bore passed through safely, and so perfect is its every particular in design and completion, that the great Lake Tunnel, the wonder of all our neighbors, is a success for all time."

At 6 P.M., when Engineer Chesbrough emerged from the tunnel, he was not only famous (he had been that for 10 years owing to a skillful report on the London waterworks,) but poised on the brink of international acclaim.

Europe Gawked . . . and Copied

"At France's Universal Exhibit next year, (the World's Fair of its day,) the French proudly displayed a miniature of Chesbrough's tunnel that won raves from Parisians and their guests. Soon, engineers on two continents were blueprinting designs for under-water tunnels based on the Lake Michigan wonder. In time, such tunnels brought not only pure water to disease-struck cities but later served as models for subways and traffic-tubes.

Thus, on a windy October day in Chicago in 1866, a new era in engineering was opened by a 54-year-old waterworks expert with a desire to bring pure water to Chicagoans.

Chesbrough, however, did not sit back to enjoy his clippings. He quickly designed a second Lake Tunnel three times longer than the first, helped New York build its famed Croton Water project, mapped a comprehensive water and sewer program for Chicago that is the basis for the systems in use today.

Fittingly, Chesbrough, in 1879, became Commissioner of Public Works, was elected President of the American Society of Civil Engineers. His death, on August 18, 1886, took from Chicago one of the most able, far-sighted and public-spirited engineers it had ever known. A bronze plaque, memorializing his life and works, is enshrined on the west wall of the Water Tower.

An Immigrant Draftsman

The waterworks trail-blazing for which Chicago had become famous did not dead-end with the death of Chesbrough. Two years before his death, a quiet, unassuming Stockholm-born immigrant draftsman, John Ernst Ericson, became assistant tunnel engineer and, in 1897, City Engineer.

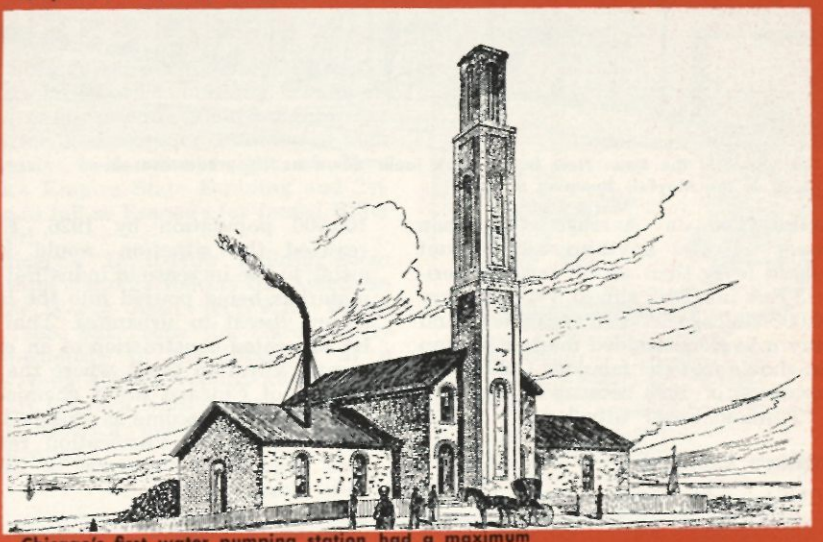
Ericson's was the dynamic leadership that directed construction of the Central Park Pumping Station (1900), Springfield Pumping Station (1901), Roseland (1911), Mayfair (1918), and the mammoth Western Avenue Pumping Station (1927), at that time the world's largest. He also planned the Thomas Jefferson station which opened the year after his death (1928).

The King of Sweden

So world-famous did Ericson's efforts become that in 1913, the King of Sweden personally decorated him with the Royal Order of Vassa. And it is to Ericson's credit that each station built in his lifetime is still pumping water to Chicagoans today.

Perhaps Ericson's greatest achievement was in bringing pure water to the

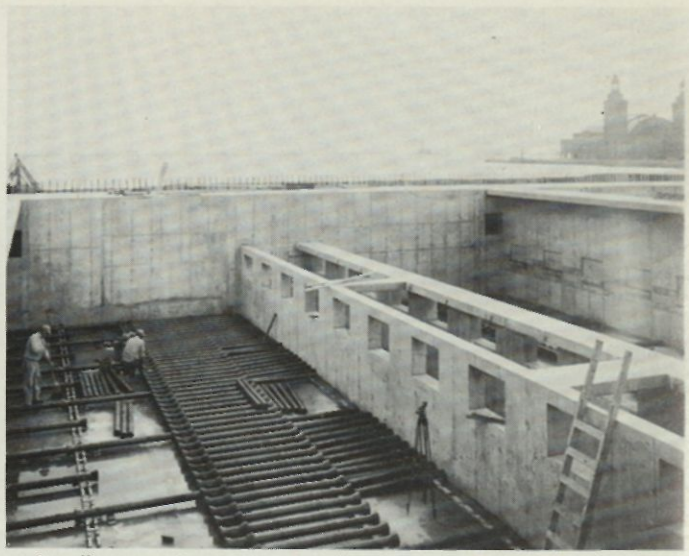
Harper's Weekly in 1867 recorded the historic occasion of official inspection after completion of the first under-the-lake water tunnel with this drawing.



Chicago's first water pumping station had a maximum capacity of 1.8 million gallons of water each day.

The first crib intake as seen by the *Harper's Weekly* artist. It was built in 1865.

"The city it serves"—That's the view of soaring skyline seen from main pipe gallery of Central District Filtration Plant.



Installing cast iron piping for filters at new Central District Filtration plant—looking east—Navy Pier in background.

State of the Nation

Willing Water, AWWA Journal, told of these sad conditions in June, 1958:

- One out of five U. S. water utilities (there are 18,000) is deficient in water supply.
- Two out of five are short of transmission capacity.
- One out of three is deficient in pumping capacity.
- Two out of five lack treatment capacity.

On the bright side, *Willing Water* observed the water utilities planned or budgeted $600,000,000 worth of water improvements during 1958. Of this total, as we have already noted, Chicago's $154,600,000 program for 1958-1962 was in keeping with the public's needs.

An Economy Program

This sizeable expenditure, if it appears imposing, actually will save Chicagoans money. As *Fortune* soberly pointed out: "Water and sewer facilities will be a lot more costly in the future than they are now."

Therefore, to speed the plan is to spare the citizen's pocketbook, especially as construction costs, according to the *Engineering News-Record* Index, have soared 600% between 1913 and 1957, and have moved steadily upwards since.

Chicago will save because both its public and its Government believe in "public services at a maximum," and in keeping costs at a minimum. There is no doubt, however, that the real reason for the success of the 1958-62 Five Year Plan has been not only the City's technological know-how, but the support and approval of the public and their elected officials.

The Problem of People

Said *Fortune:* "the basic problem in water and sewers is not money . . . nor technology. The big problem is people . . . people who turned down bond issues in communities with inadequate water facilities."

Chicago — thanks to its people — was spared this problem. Their votes for construction-minded councilmen has minimized the cost of inflation, kept water facilities adequate, water service dependable, and City growth assured. No wonder the *Chicago Tribune* (9-28-58) wrote: "Planners regard a city's need for water as a barometer of its growth. In Chicago's case, they find the needle pointing toward a booming future."

With continued support from the administration, the public and the press, by 1962, the Chicago Department of Water and Sewers will have realized a 121-year-old dream, which was expressed by *Harper's Weekly,* in 1902, as follows:

"There seems to be no reason why Chicago should not have the largest, purest supply of water of any city on the globe."

Answered Chicago: "I Will."

A familiar sight 100 years ago was this water peddler who brought his wares to city housewives.

Courtesy Chicago Historical Society

"LARGEST EXPERIMENTAL WATERWORKS EVER"

National Publication Devotes Cover Story to Water Purity Research Program

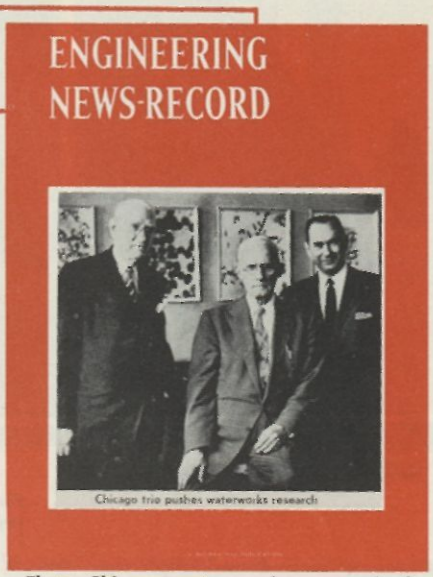
The large letters spelling out "Largest Experimental Waterworks Ever," appeared on April 17, 1958, in the cover story of the *Engineering News-Record.* The article was about Chicago's continued efforts to supply the purest possible water to the public. It pointed out that Chicago does more than supply 349,800,000 gallons of filtered water to 1,500,000 south side and south suburban residents as the 1958 record shows. It points out that years of painstaking research have gone into making the city water supply the best in the nation.

Following are the highlights of the ENR story which we reprint here, verbatim, for your information:

A Vast Program

"By virtue of its vast and extremely fruitful program of water treatment research, Chicago's water department today stands in the vanguard of a field of endeavor that relatively few other operating water agencies have entered.

"Over the years, this research has produced a remarkable number of advances which have easily justified the cost involved to Chicago and have had a by-product value to the rest of the nation's waterworks far in excess of the local return. In addition, the pioneering research effort in Chicago has had, and undoubtedly will continue to have, salutary effect in encouraging other operating water supplies to embark on similar though less extensive programs.



Three Chicago water engineers received cover story billing from a leading engineering news magazine.

Early Research

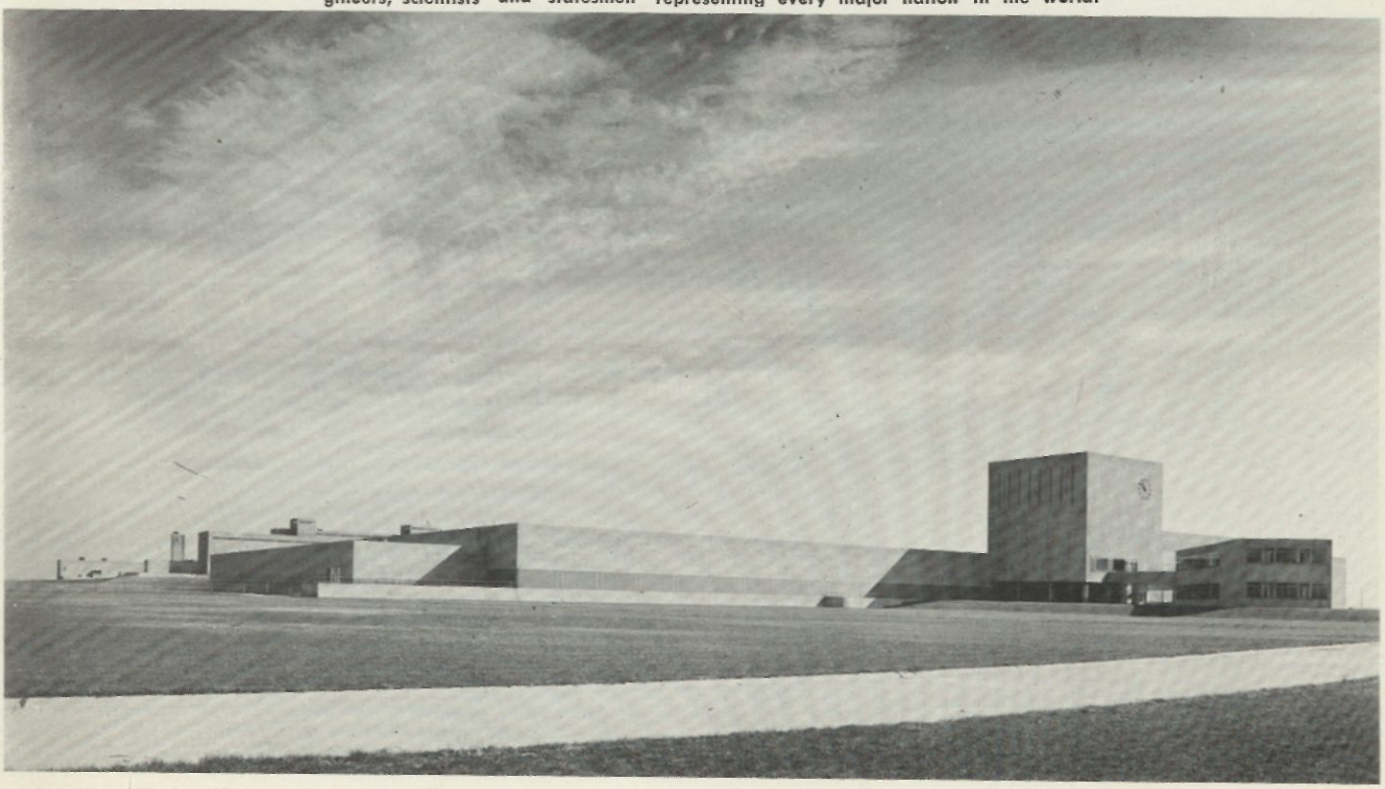
"Chicago's research in water purification began in 1928 in an experimental filtration plant at 69th and Oglesby. Ten years of experience at that plant went into the design of the 320 million gallons a day South District Filtration Plant on Lake Michigan.

"The old experimental plant was under the direction of John R. Baylis who had come to Chicago in 1926. The first research work there was devoted to removing objectionable odor and taste and led to the trial of activated carbon. Baylis wrote the first authoritative report on this process to show that it could be used on a large scale to remove odor from water. Today activated carbon is the most widely used means of removing odor.

The Coarse Sand Riddle

"One of the toughest research problems," the Magazine continued, "that Chicago ever whipped involved design of the filter beds for the South District plant. Experimental plant operations showed that in the winter months the coagulation preceding filtration was weak, requiring fine filter sand. Contrarily, during the summer months the relatively good coagulation achieved precluded the use of fine sand for the filters.

The low striking lines of the South District Filtration Plant have been viewed by engineers, scientists and statesmen representing every major nation in the world.



"Attacking the problem by trying to strengthen coagulation during the winter, Baylis and crew discovered that an activated silicate (sodium silicate treated with sulphuric acid) did the job. Consequently, a comparatively coarse sand was able to meet the requirements of both summer and winter operation, with an added benefit. The number of filter washes annually is about half that a finer sand would require.

High Filtration Rates

"Experiments conducted over the past 10 years with the South District plant filters have proved that Lake Michigan water at Chicago can be filtered at a rate of 5 gallons per minute per square foot of filter surface with no impairment of bacteriological quality. In fact, the filter performance is better for the high rate filters than for those operated at the very common 2 gallons per minute rate. This work which was under the direction of Mr. Baylis who had moved over to run the South District Plant, is the backbone of the current trend by water engineers all over the country to design for higher and higher filter loadings. It is also the basis for the hydraulic design capacity of 3.5 gallons per minute for the Central District Plant.

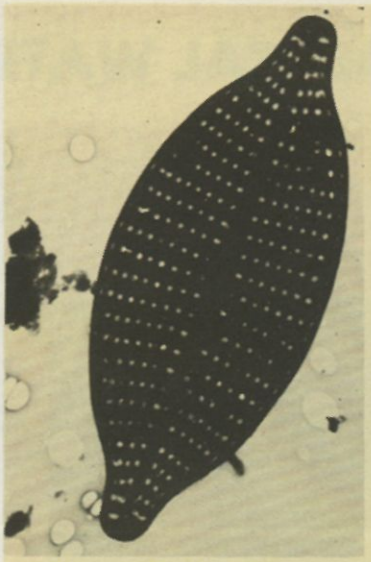
Chemical Handling

"One of the biggest research activities at the South District plant concerns handling of chemicals. When the plant was designed, handling most of the chemicals in a dry state was considered the best procedure. However, Chicago soon found that the cost of keeping dry-handling machinery running was quite high. Conversion to using such chemicals as alum and ferrous sulphate in liquid form and activated carbon in a slurry followed.

"The Chicago pioneers didn't have much to go on in handling liquid activated carbon. Consequently, experimental equipment was installed, operated and perfected over several years before the full-scale conversion was made. Today the system works extremely well, with a $6 per ton saving in purchase of the chemical and considerable additional saving in handling it.

"The method employs hopper-dump railroad cars dumping into slurry tanks equipped with agitators, where the activated carbon is mixed with water and pumped to feeding tanks in the chemical building.

"Recommendations," ENR continued, "that liquid aluminum sulphate and ferrous sulphate be tried came from the manufacturers of that chemical.



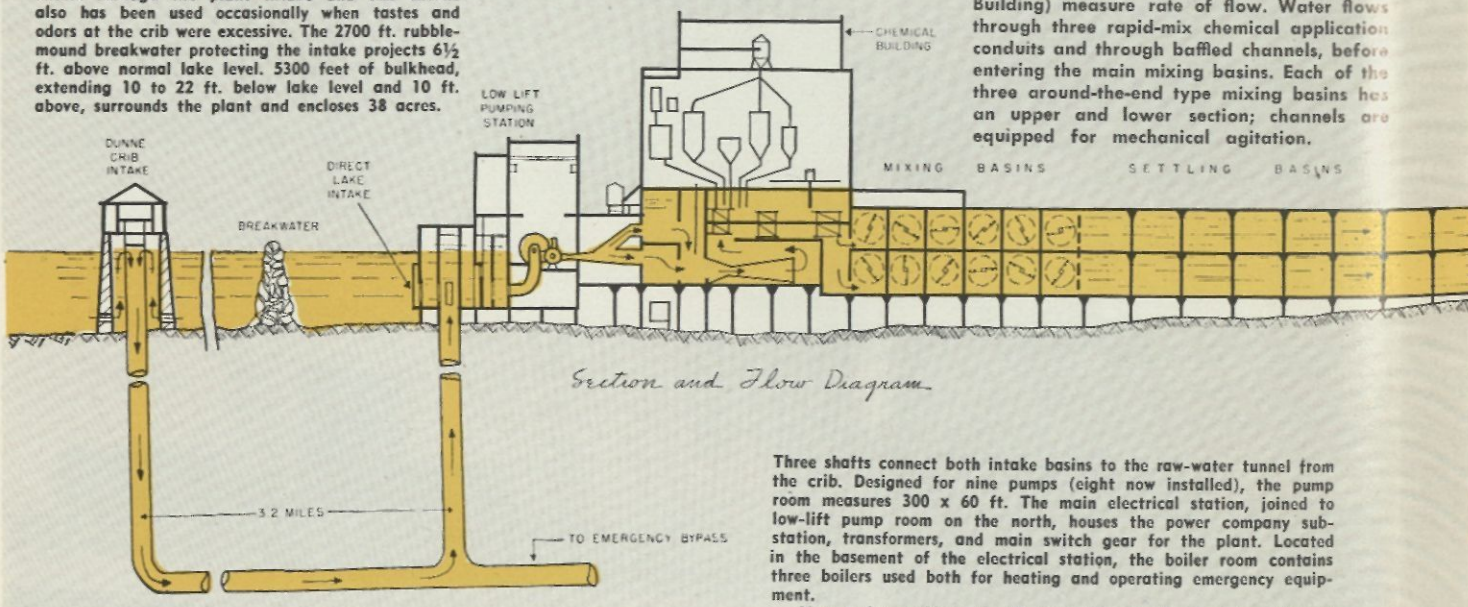
Navicula, magnified 13,500 times.

Asterionella, 9,500 times real size.

Photos from the electron microscope reveal in sharp detail the presence of innumerable plant micro-organisms such

Most of the raw water is obtained from the Dunne Crib. During periods of high demand, some water enters through the plant intake and this intake also has been used occasionally when tastes and odors at the crib were excessive. The 2700 ft. rubble-mound breakwater protecting the intake projects 6½ ft. above normal lake level. 5300 feet of bulkhead, extending 10 to 22 ft. below lake level and 10 ft. above, surrounds the plant and encloses 38 acres.

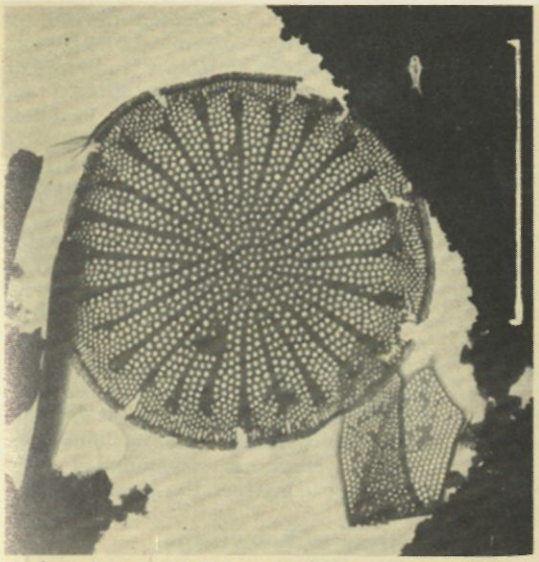
Flow meters located between raw-water conduits and mixing basins (below Chemical Building) measure rate of flow. Water flows through three rapid-mix chemical application conduits and through baffled channels, before entering the main mixing basins. Each of the three around-the-end type mixing basins has an upper and lower section; channels are equipped for mechanical agitation.



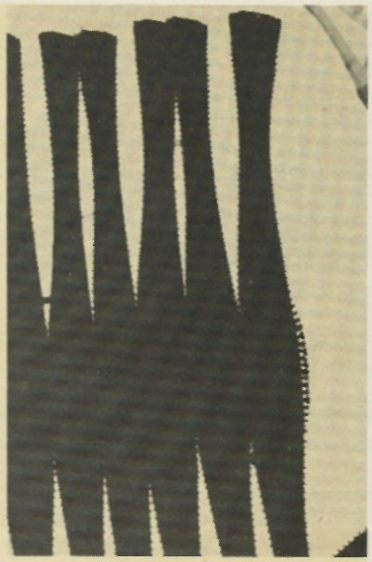
Section and Flow Diagram

Three shafts connect both intake basins to the raw-water tunnel from the crib. Designed for nine pumps (eight now installed), the pump room measures 300 x 60 ft. The main electrical station, joined to low-lift pump room on the north, houses the power company substation, transformers, and main switch gear for the plant. Located in the basement of the electrical station, the boiler room contains three boilers used both for heating and operating emergency equipment.

If a major accident should prevent water from passing through the plant, the emergency by-pass can be employed. At such a time, water would be chlorinated at the by-pass shaft.



Stephanodiscus, 10,000 times real size.



Fragilaria, magnified 4,480 times.

as these in water samples taken from Lake Michigan at the South District Filtration plant—before filtration.

And research also licked a pressing distribution pipe corrosion problem in Chicago.

Electron Microscope

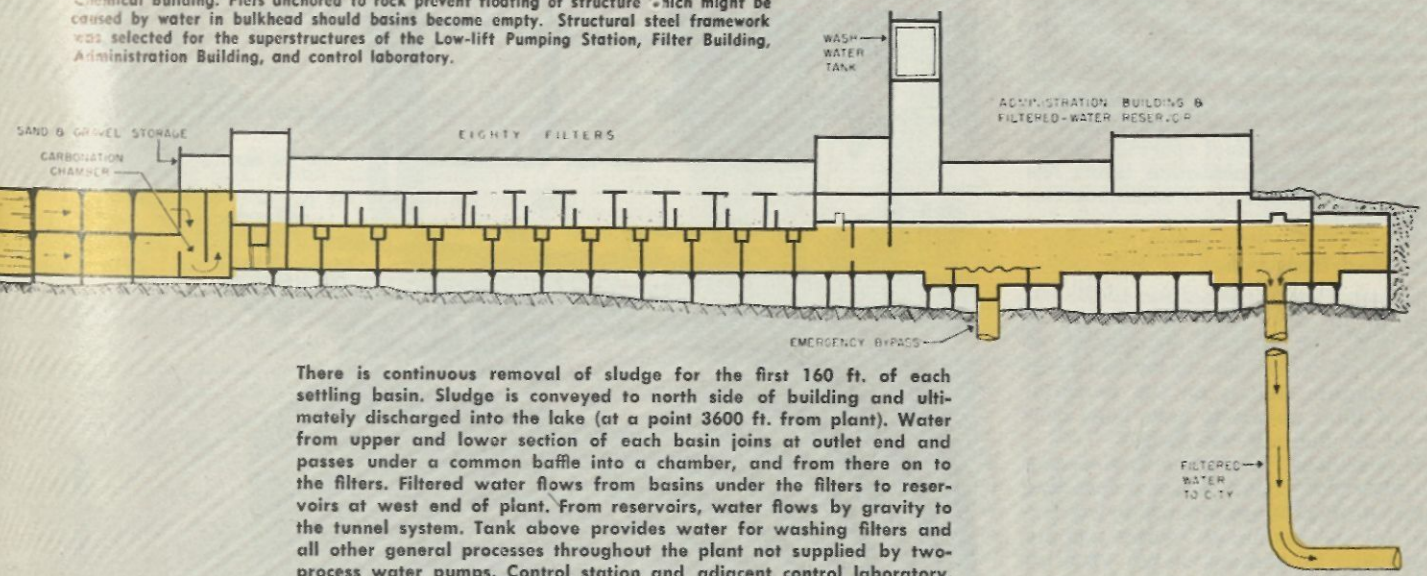
"One of the most important research instruments at South District is a $20,000 electron microscope used to detect coliform bacteria. Its chief value is the speed with which bacteria in the water can be identified, especially when a water main breaks or it is necessary to cut into the 4,000 mile water distribution system that serves Chicago.

"Under normal conditions it would take about 96 hours to sample the water and test for bacteria. With the microscope the time has been shortened to 20 hours."

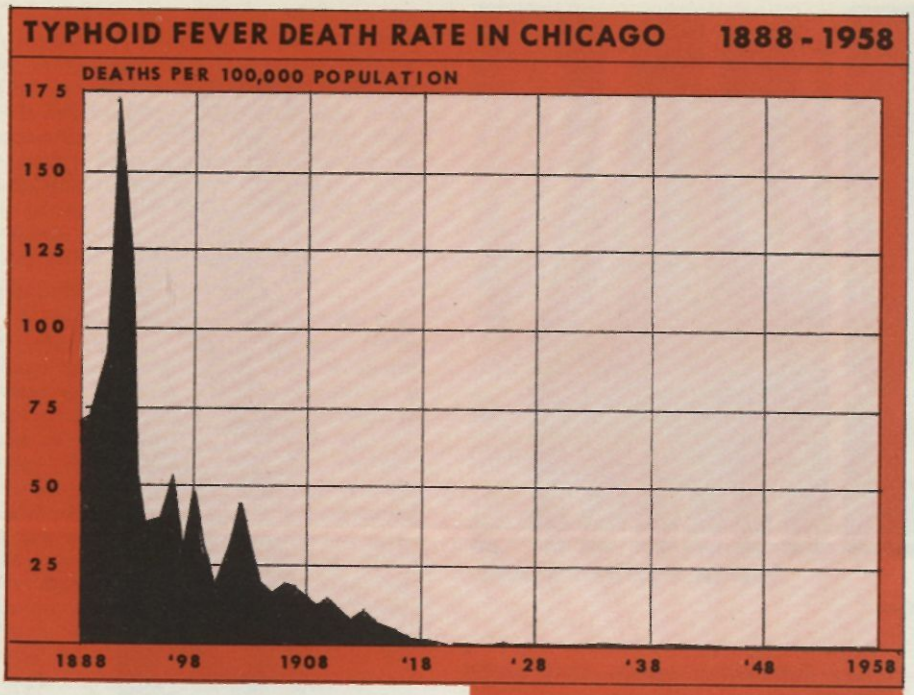
(Note: After a water main break on Thanksgiving Day, 1958, the use of the electron microscope made it possible to determine that drinking water was safe within 15 hours of the mishap.)

Renowned Chicago sculptor Abbott Pattison has symbolized water purification process with this work at South District Filtration Plant.

Reinforced concrete was employed for substructures of intake walls, Low-lift Pumping Station, raw-water conduits (below Chemical Building) mixing and settling basins, and filtered-water reservoirs; reinforced concrete was also used for the framework of the Chemical Building. Piers anchored to rock prevent floating of structure which might be caused by water in bulkhead should basins become empty. Structural steel framework was selected for the superstructures of the Low-lift Pumping Station, Filter Building, Administration Building, and control laboratory.



There is continuous removal of sludge for the first 160 ft. of each settling basin. Sludge is conveyed to north side of building and ultimately discharged into the lake (at a point 3600 ft. from plant). Water from upper and lower section of each basin joins at outlet end and passes under a common baffle into a chamber, and from there on to the filters. Filtered water flows from basins under the filters to reservoirs at west end of plant. From reservoirs, water flows by gravity to the tunnel system. Tank above provides water for washing filters and all other general processes throughout the plant not supplied by two-process water pumps. Control station and adjacent control laboratory, located at southwest corner of Filtration Building, keep the chemical control engineer informed of changes in water resulting from chemical treatment.



Atoms and Meters

Continued the magazine: "Another major research operation is the continuous monitoring for radioactivity with geiger counters, of both the raw and treated water from the plant. This operation, which has been going on for the past eight years, was instigated at the suggestion of Chicago University scientists during the early development stages of nuclear fission materials.

"There is much current practical research under way at South District. One of the nation's first magnetic flow meters, a 20-inch size, is being tested (and successfully) on a filter effluent line in advance of a venturi meter. An experimental method of removing sand and fine gravel from filters with a sand pump has shown itself to be satisfactory. And removal of every other flight in the scraper (for 20-foot spacing) in one of the plant's sedimentation tanks has shown no impairment of sediment collecting capacity."

Filter Bed Research

"Chicago sees the need for additional research in sand filter bed design to cope with the gradual disturbance of the sand and gravel due to backwashing. Two separate studies on the performance of filter materials have been conducted for the past two years.

"It is obvious," concludes *Engineering News-Record,* "that Chicago is spending a great deal on research, even in proportion to its mammoth water supply operation . . . because of the value of the program.

"Judging from the citations Chicago's work has received over the years, the rest of the nation's waterworks industry also recognizes its great value."

December 24-29

Between December 24-29, 1958, the water research pioneering of which *Engineering-News Record* wrote, paid off again for Chicago's people. The South District plant, on those days, was able to supply crystal clear and pure water to south side and south suburban residents despite a startling deterioration in the quality of raw water taken in at the Dunne Crib.

Through the use of activated carbon in liquid form, a method devised by Chicago water chemical engineers, highly-polluted Northern Indiana industrial waste water was filtered and purified, although very nearly a mountain of activated carbon was required to meet the emergency.

Earlier, on August 30, the South District plant not only supplied pure water but did so at the rate of 543,000,000 gallons an hour, between 6 and 7 P.M. Again, there was water enough for all, thanks to the high-rate filtration system pioneered by city engineers.

In the words of the *Chicago Daily Calumet*: "Many engineers consider the South District Filtration Plant to be the greatest hydraulic marvel since the Roman emperors commanded their armies to construct the aqueducts."

College of Knowledge

The filtration plant, known as the "College of Waterworks Knowledge," could not maintain its place as America's Number One experimental water plant if it did not constantly improve its physical facilities. Some examples of the improvements in 1958:

- Rebuilt one giant filter.
- Rebuilt two boilers.
- Installed a new sand pump for filter operations.
- Installed three of the most modern butterfly valves.
- Installed a new 20,000,000 gallon capacity per day water pump to clean the filters.
- Did extensive research into new methods of applying lime and fluorine to the City water supply.

Research project being carried out at the South District Filtration Plant.

CITY PLANS SOUTHWEST PUMPING STATION

Water could not flow from the City's four Lake cribs or South District Filtration Plant to metropolitan Chicago's 4,630,000 water-users without receiving a boost in pressure from the City's 11 pumping stations. These stations—strategically distributed across Town—are now being modernized under the Five Year Plan (See Page 12).

To these familiar brick and stone structures, housing 50 pumps capable of moving two billion, six hundred million gallons of water each day, is being added still another station, this one to serve the far reaches of the Southwest Side.

The Southwest Pumping Station is to be built at 84th Street and S. Keeler Avenue at an estimated cost of $3,200,000. In 1958, this station, planned to meet the future needs of a growing community, was taking shape from its blueprints, getting the final detailed checkover by Department of Public Works engineers who'll supervise the construction, scheduled to start sometime in 1959.

Four New Pumps

Initially, the Southwest Station will house four pumps having a peak total output of 175 million gallons of water each day. But, when the community grows, two additional 50 million gallon a day pumps will be installed—raising capacity to 275 million gallons a day.

The difference between the new Southwest Station and the first Chicago Water Works, erected in 1840 by the privately-run Chicago Hydraulic Company, is roughly analogous to the new super jetliners that streak into Chicago's airports as compared with the first airplane flown by the Wright Brothers at Kitty Hawk.

From Barrels To Billions

The lone pump in the Chicago Hydraulic plant moved 25 barrels a minute from the Lake, or 1.8 million gallons of water each day. The big pumps of the Southwest Station will ultimately yield more than 150 times as much in a like period.

And, whereas the first waterworks was housed in a ramshackle, wooden structure that appeared perilously on the brink of collapse, the Southwest Station will be of sturdy brick-and-steel construction. To be surrounded by park, it is designed to blend into the architectural pattern of the neighborhood it serves.

Some measure of how far Chicago has come since its Frontier Town days can be had from the fact that its 11 pumping stations in 1958 pumped an average of more than one billion, six million gallons of water each day. This dwarfs the first 1.8 million gallon per day flow of the Chicago Hydraulic unit.

A Lifetime Of Use

The City of Chicago built its first public-owned station in 1853 under the direction of Mayor-to-be De Witt C. Cregier, where the present-day Chicago Avenue Station now stands. Cregier's 8 million gallon pump, "Old Sally," perked along smoothly for 50 years, outlived its builder by six. Chicago citizens got a sound return on their investment in the pump. And "Old Sally" set the style. Soon, Chicago waterworks pumps became justly famous for their efficiency and durability.

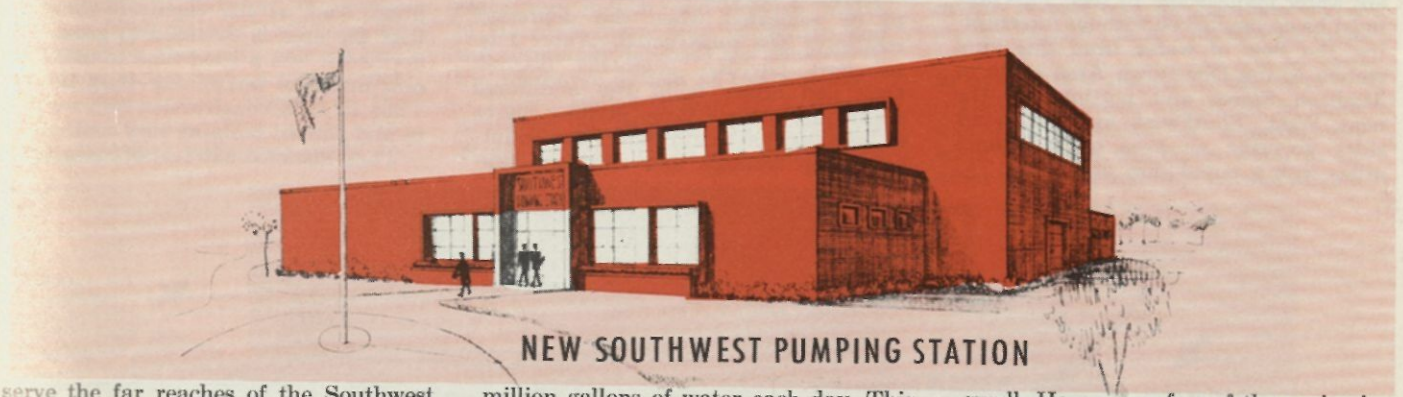
In 1958, for example, two 17.5 million gallon per day units were removed from the Mayfair Pumping Station on the Northwest Side. This would not be unusual as every pump, sooner or later, wears out. But these old-style triple expansion pumps had been serving the public since World War One. Symbolic, too, of the passing of a colorful era in Chicago waterworks history was the razing of Mayfair Pumping Station's 180-foot-high smokestack, long a landmark to the surrounding neighborhood. The stack had been built 40 years earlier to draw off the gases from the boilers which powered the station's steam pumps. Because engineers feared the adverse affects of a dynamite charge to reduce the stack, it was torn down, brick by brick, by City workmen. A new, higher stack, replaced it.

Throughout 1958, from Mayfair on the Northwest Side to Sixty-Eighth Street on the Southeast Side, Chicago's Pumping Stations underwent a steady modernization process.

From The Record Book

Department records in 1958 listed innumerable improvements, large and small. Here are a few of the major improvements.

- An 80 million gallon a day capacity pump upped Springfield Station capacity from 280 to 335 million gallons each day.
- Adding a 60 million gallon a day pump completed modernization work at Central Park Station.
- A 75 million gallon a day pump, to be replaced by a new larger unit, was taken out of service at Western Avenue Station. It had pumped more than 341 billion gallons of water there since 1927, enough water, incidentally, to last a city of 100,000 population for many many years.
- Two new 500 Horsepower boilers were installed in Mayfair Station.
- And a new 50 million gallon per day capacity pump went "into the line" at Sixty-Eighth Street Station.



NEW SOUTHWEST PUMPING STATION

Just to turn the pumps of Chicago's 11 stations in 1958 required some doing. The energy-hungry pumping stations swallowed 149,687 tons of coal; consumed 67,117,015 kilowatt hours of electricity to turn their pumps.

An Unusual Story

One of the more unusual stories about Chicago's pumping station activities in 1958, centers around the Cermak Avenue Station, at 735 West Harrison Street. It is located in an area that will soon become "The Crossroads of Chicago," and because of it, this vital station (it supplies water to the Loop and part of the South Side,) will undergo some unusual changes.

PUMPING STATION BECOMES ISLAND

How Downtown Area Public Will Get Water from Station in a Superhighway

The Cermak Pumping Station at 735 W. Harrison Street is destined to become an "island" located between the North and South lanes of the proposed South Expressway.

The Expressway, on which construction is to start in 1959, will extend from Congress Street south to the City Limits. Its depressed roadways will require the lowering of Cermak's present water mains some 15 feet. This task must be accomplished without interrupting the flow of water from this vital station to the Downtown Area south of Madison Street and portions of the near West, Southwest and Southeast sides covering an area of 16 square miles with a population of 400,000.

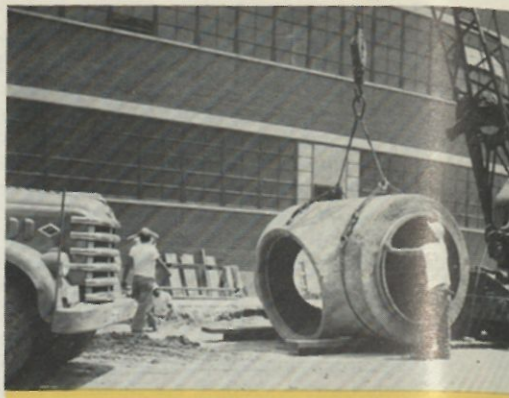
Station at the Crossroads

This 300,000,000 gallon per day capacity station could continue its job without fuss or fanfare except that it is located immediately south of the nerve center of the City's billion dollar superhighway system, a center called "The Crossroads of Chicago" where the Northwest, Congress Street, and South Route Expressways meet. It was, therefore, impossible to locate the Expressways entirely to one side of the station.

Building New Mains

Because the existing mains will need to be relocated when the depressed roadways are constructed, Water Distribution Division engineers decided they had better build two additional mains and replace three existing mains to keep 400,000 South Siders and countless Loop workers and shoppers supplied. And, as the engineers estimated that the area is destined to grow, they decided it was a good time to make the new mains of larger size than the old. Thus, in 1958, construction crews moved in and started building new mains.

They installed 830 feet of main, much



Water Distribution Division workers set a

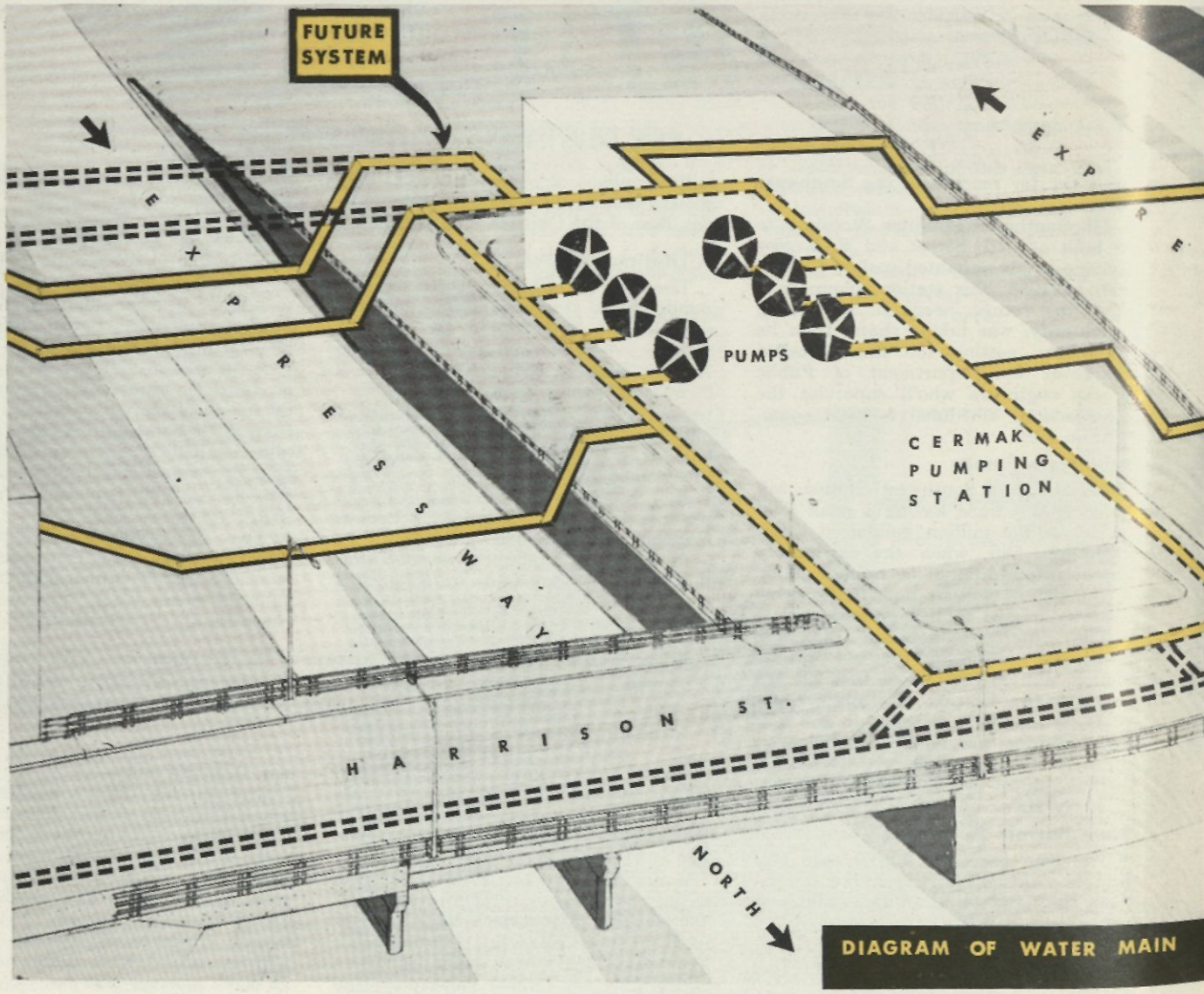
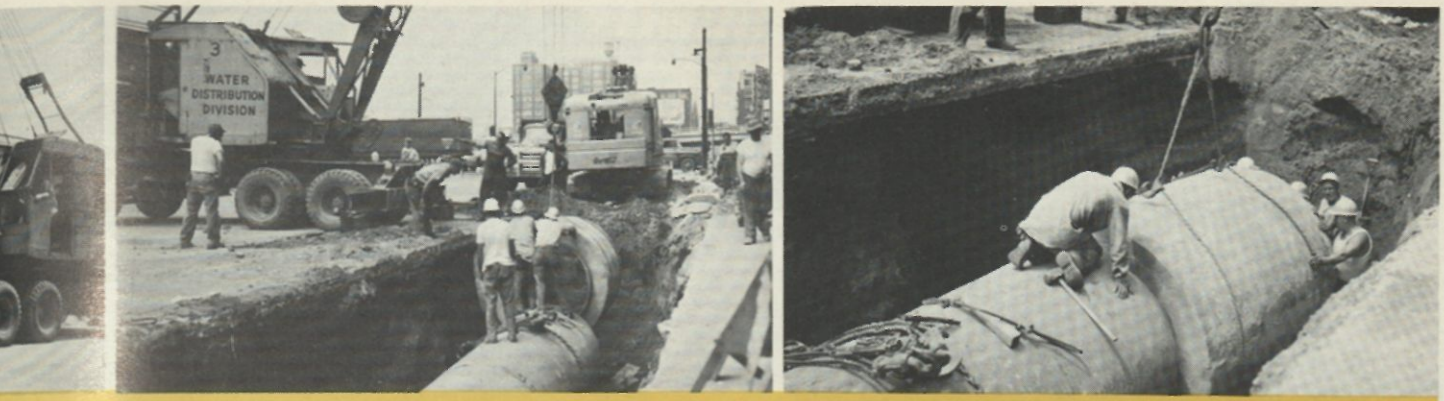


DIAGRAM OF WATER MAIN

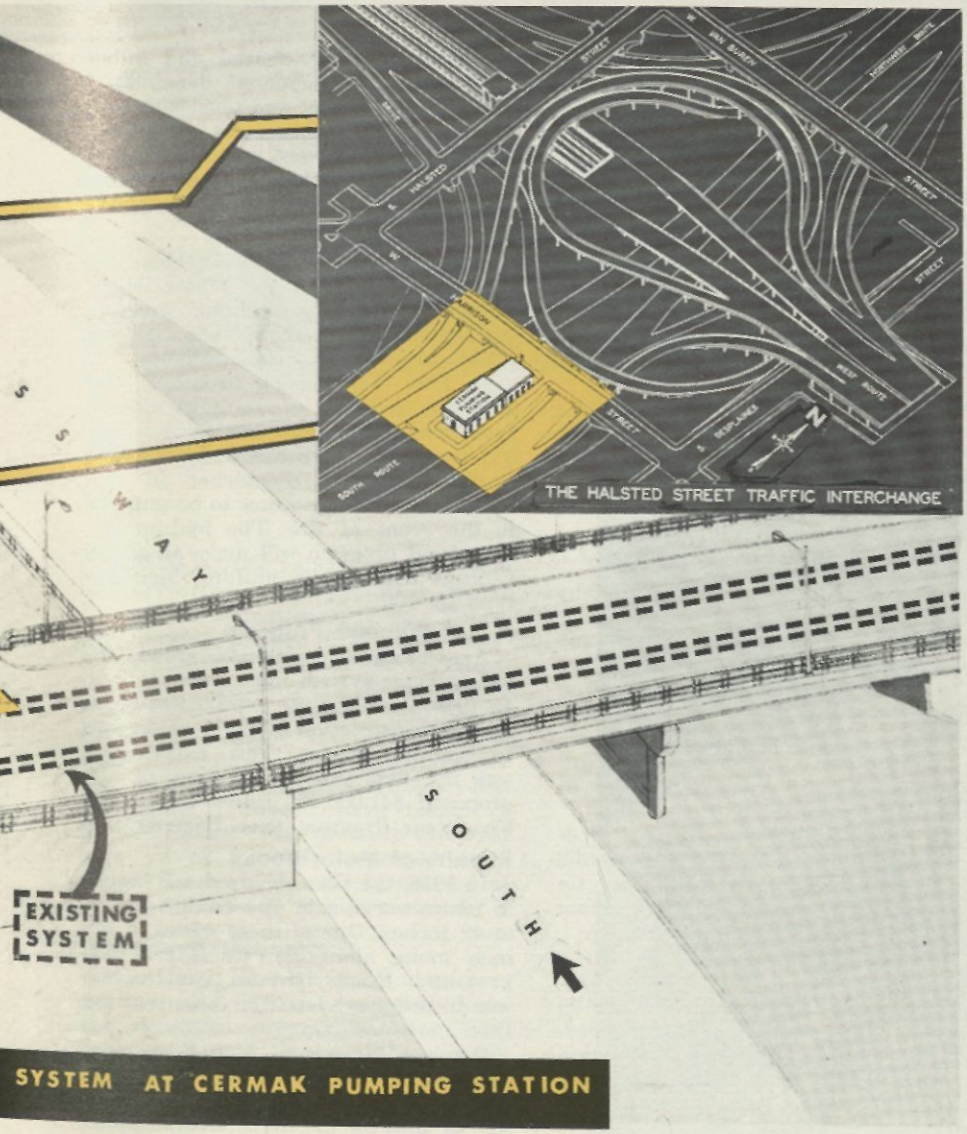


giant 54-inch concrete "T" for a water main connection in Desplaines Street.

of it 54 inches in diameter, in Vernon Park Place. This main extends from the 48-inch pipe on the south side of Cermak Station to the 36-inch and 48-inch mains in Blue Island Avenue on the west of the Station. This is an additional main which will temporarily replace the 36-inch and 48-inch mains in Harrison Street west of Station and will ultimately increase the capacity of the discharge system of this Station.

They installed another 320 foot main 54-inches in diameter in Desplaines Street between the 36-inch and 48-inch mains, respectively, in Harrison Street and in Vernon Place. This 54-inch main is an additional main and will be used to by-pass the station on the east.

Hereafter, when one main is made inoperative because of superhighway work, engineers will divert water to another main and maintain normal service.



SYSTEM AT CERMAK PUMPING STATION

Repair crew at the site of a 48-inch main break.

Workman installs a "split sleeve" under a retaining wall. Sleeve will mend a broken 24-inch main supplying the Loop at Wacker and Wabash.

This 24-inch main is being lowered to a depth 25 feet below present ground level through rock formations below the Northwest Superhighway, now under construction.

Plumbing Laboratory and Inspectors Work to Prevent Water Contamination

The Plumbing Section of the Water Distribution Division has the task of surveillance over the water systems from the mains to within premises to prevent contamination as water flows to the user. Inspectors check into the plumbing systems of thousands of homes and businesses annually to see that the pipe-work is installed in a workmanlike manner, in accordance with the requirements of the City Code.

Plumbing inspectors — utilizing the findings of the Chicago Plumbing Testing Laboratory — also check all water supplied fixtures and equipment to see that it has been approved for installation and that it has been so connected as to prevent contamination of the drinking water system. A sampling of such equipment would be clothes washers, dishwashers, dental units, food waste disposers, water bubblers, steam boilers, sterilizers for surgical instruments, etc.

Inspectors regularly are briefed regarding the findings of the Plumbing Testing Laboratory, which tests all water-using devices to insure their conformity with safety standards established in the Chicago Plumbing Code.

Inside the Laboratory

During 1958, the City Plumbing Laboratory conducted 171 tests on water-using fixtures and appliances.

Its representatives held 99 special conferences with manufacturers of

Testing a dental unit to determine its efficiency in protecting the water supply.

Checking anti-hose feature on spout of slop sink faucet.

Determining whether vacuum breakers are at proper height on a battery of water closets in an unfinished school.

water-using appliances and fixtures, and provided data on test results to sanitarians, students, safety engineers, design engineers, and architects from numerous U. S. cities and 11 foreign nations. In all, more than 1800 persons received information on basic principals of good plumbing design and installation at the Chicago laboratory. This was in addition to the thousands of field contacts made by plumbing inspectors.

An Inspector's Diary

Just how a plumbing inspector goes about his work to prevent contamination in the system is perhaps best told by a sampling of the reports of a plumbing inspector, collected in the course of one week.

• "General meeting of Plumbing Inspectors. Discussed new Department regulation. Saw a demonstration of two new type clothes washers, and one ultra-sonic instrument cleaner.

• Saw a 6-inch connection being installed for a new manufacturing plant. The service trench is deep enough to permit 5 feet of covering over pipe to prevent freezing. Pipe of proper materials.

• Answered complaint of leaking water. Store owner afraid water will seep into his basement. Found flooded sidewalk, water running slowly, and no danger of flooding basement. Notified District to determine if leak is on City's portion of service pipe.

• A complaint of no water on 2nd floor of two-flat building. Found a broken riser control valve. Notified owner to replace it.

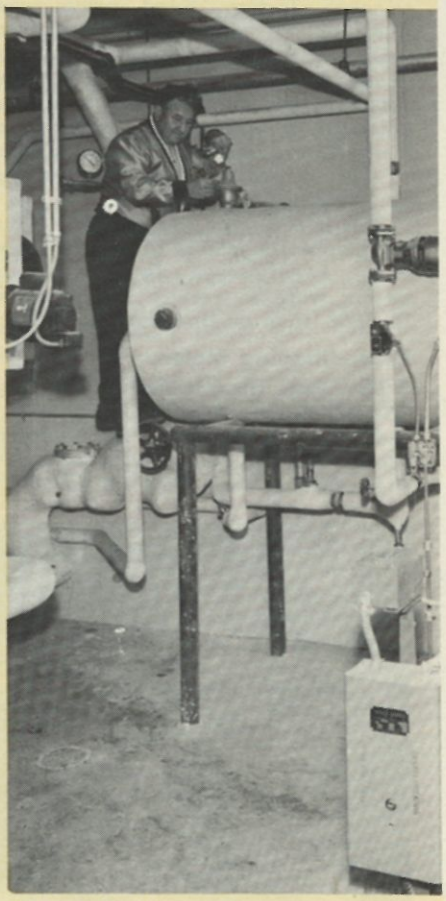
• Four new three-flat buildings being erected. Pipework okay. Hot water tanks have unsafe relief valves. These must be replaced with acceptable temperature and pressure relief valves properly installed. Bathtubs have submerged faucets. Must be replaced with over-the-rim spouts.

• Plating plant adding three new vats and high pressure steam boiler. Met plumbing contractor on job and advised him to keep water supply openings to vats above the rims to prevent contamination of drinking water. Water supply is connected solidly to boiler feed tank. Steam pressures of up to 100 pounds per sq. inch could force boiler water back into domestic supply. Water connection to boiler feed tank must be over-the-rim.

• While passing, noticed some remodeling work in a factory. Investigated and found two additional toilet rooms and a 15 ton air conditioning unit being installed. Undersized piping in both toilet rooms. Plumber is from out of town and has no license. Notified owner for his protection to employ a licensed and bonded plumber, to obtain a permit and to correct the violations so that work is in accordance with the Code.

• Row of houses being razed for expressway. Notified wrecking contractor to have his plumber seal the water services to prevent flooding and excessive waste of water."

Checking for proper model and size of temperature and pressure relief valve on hot water tank.



Economy Is Watchword At Water Meter Shop

The Water Meter Division, which supervises the purchase, maintenance, and repair of the 145,904 meters that serve Chicago water-users, has acquired a reputation for economy and originality in meter shop operations.

From the time a water meter rolls off the manufacturer's assembly line, Water Meter Division employees are on the job to assure its efficient operation.

Several years ago, rather than test thousands of new meters in the City's shop, the Division began sending experts to the manufacturer's plants. In 1958, inspectors travelled to plants in Uniontown, Pa., Newark, Milwaukee, Boston, and New York, where they inspected meters in one-eighth the time that would have been required in the City shop. Moreover, there was no time lost in returning defective meters to the manufacturer. The savings from this on-the-assembly line inspection system amounted to thousands of dollars.

Do-It-Yourself

Another economy practiced by the Division has been that of manufacturing its own meter parts when factory prices appeared to be too high.

For example, a meter spindle cost the Division only $2.43 to manufacture although factory-quoted prices were $7.92. The Division thus saved $5.49 on each spindle it produced. The result of such small economies in 1958, when taken in the aggregate, ran into thousands of dollars. As the *Engineering News-Record* once said of this practice, "Years of effort are paying the City of Chicago dividends."

This is becoming increasingly true as the number of meters in service grows. Some twenty-seven thousand more meters were in service on December 31, 1958, than on that date in 1948.

Reconditioning Meters

The Meter Shop has a well-developed system for the reuse of old meters. It uses an economical reconditioning process that involves cleaning the meters and replacing their worn out parts. The bronze parts of the meter are cleaned by immersion in solutions of caustic potash, boiling water, nitric acid, sulphuric acid, cold and hot water.

Warped discs are straightened in new, hydraulic presses; other worn parts are removed and replaced with interchangeable parts designed by the Division. The result has been that a meter may be used at least three times rather than once and the years of its life span are at least tripled in number.

These trucks are being loaded at the new dock of the Water Meter Shop with long-wearing Chicago-type water meters.

The City and the Citizen

In 1958, the Meter Division tested 26,503 meters for accuracy. These meters ranged in size from five-eighths of an inch to one foot in diameter. Their performance was checked to make sure that each meter accurately registered the amount of water used by the plant or home-owner. All City meters, regardless of size, are tested to guarantee that they meet the standards prescribed by the American Water Works Association.

Keeping City meters up to these prescribed standards of accuracy and performance required the processing of 106,540 job orders in the Division during 1958. Some 32,728 of these were field repair jobs that took Division workers to all sections of Chicago. And 4,334 new meters were installed by Master Plumbers during the year under the supervision of the Meter Division.

In addition, the meter installation section of the Water Distribution Division replaced or repaired 6,542 meters in the field during 1958.

At the time of installation, a permanent record for each meter is set up by the Meter Division and a complete report is sent to the Water Collection Division for billing purposes.

Chicago's meters have a reputation for lasting a long time. Here we see city workers making old meters reserviceable.

Far left — Upstream side of backwater gate Leamington Avenue twenty one by nineteen foot sewer. Left — Seven by eight foot dry weather connection from Leamington Avenue twenty-one by nineteen foot sewer to Sanitary District plant.

50 MILES OF SEWERS BUILT

Downstream side of backwater gate Leamington Avenue sewer.

More than 50 miles of main sewers from 10 inches to 20 feet in diameter were built in Chicago during 1958, and 10½ miles of obsolete sewers were taken out of operation. Thus, approximately 40 miles of new work was added to the system. It now totals more than 3,706 miles. The cost of this work, including the construction of 1,800 catch basins and 1,442 manholes, was approximately $22,000,000.

Eight different agencies played important roles in this construction, including the Bureau of Engineering of the Department of Public Works, the Bureau of Sewers, private contractors for subdivision developers, the Board of Local Improvements, (under an assessment procedure,) the Department of Streets and Sanitation, the State of Illinois and Cook County.

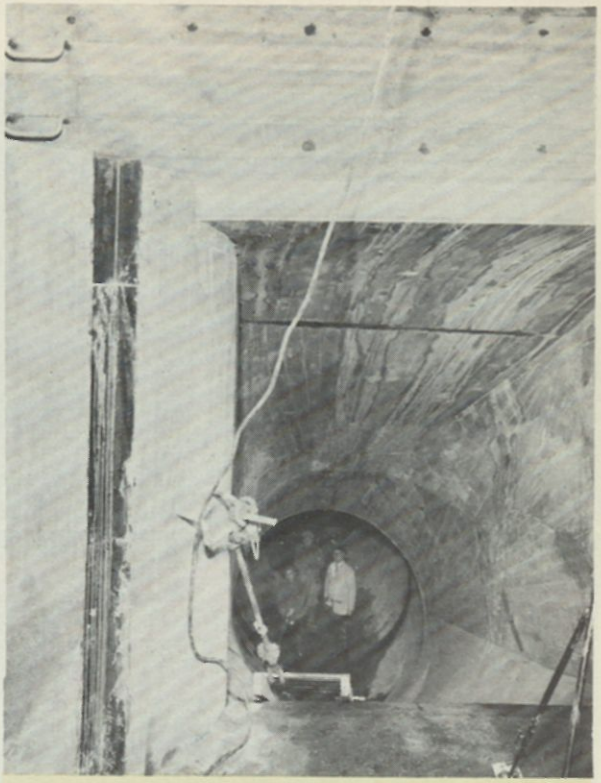
Flood Relief Program

Construction by the Department of Public Works, using sewer bond issue funds, paid for $12,000,000 of sewer construction, $3,200,000 of which started a flood relief project for the City south of the Drainage Canal and west of California Avenue.

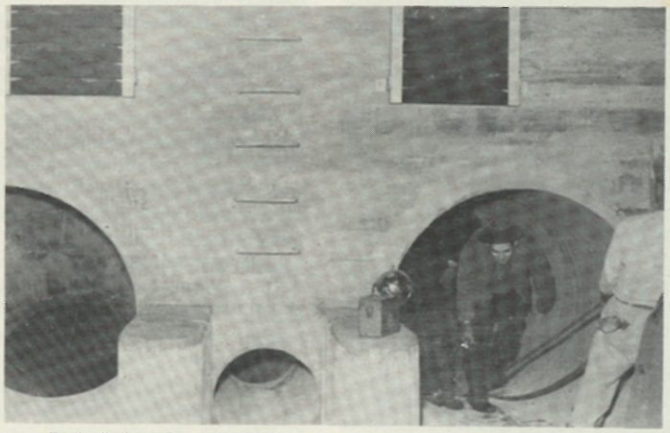
This is known as the Leamington Avenue System and is the largest conduit (21½ feet by 19¼) to be built by this City since the Pershing Road 20-foot brick conduit in 1900. Nearly fifteen miles of the new work was done by contract as part of the bond issue program and, of course, included all the largest sizes.

In carrying out relief sewer construction, many small side areas were found to be inadequately served. To remedy this condition, the Bureau of Sewers has continued the work, started in 1957, of extending branches of the larger trunk sewers into inadequately sewered areas. This year, 24 of these branch sewers, many as large as four feet in diameter, costing from a few thousand dollars to $340,000, were built by the Bureau's own construction forces. The total expenditure for this work was about $2,150,000.

Flat-roof, double-barrel diversion of seven and one half by eight and one half foot city sewer in 97th Street to fit under pavement of South Route Expressway. Work being done by contractor for Cook County Highway Department.

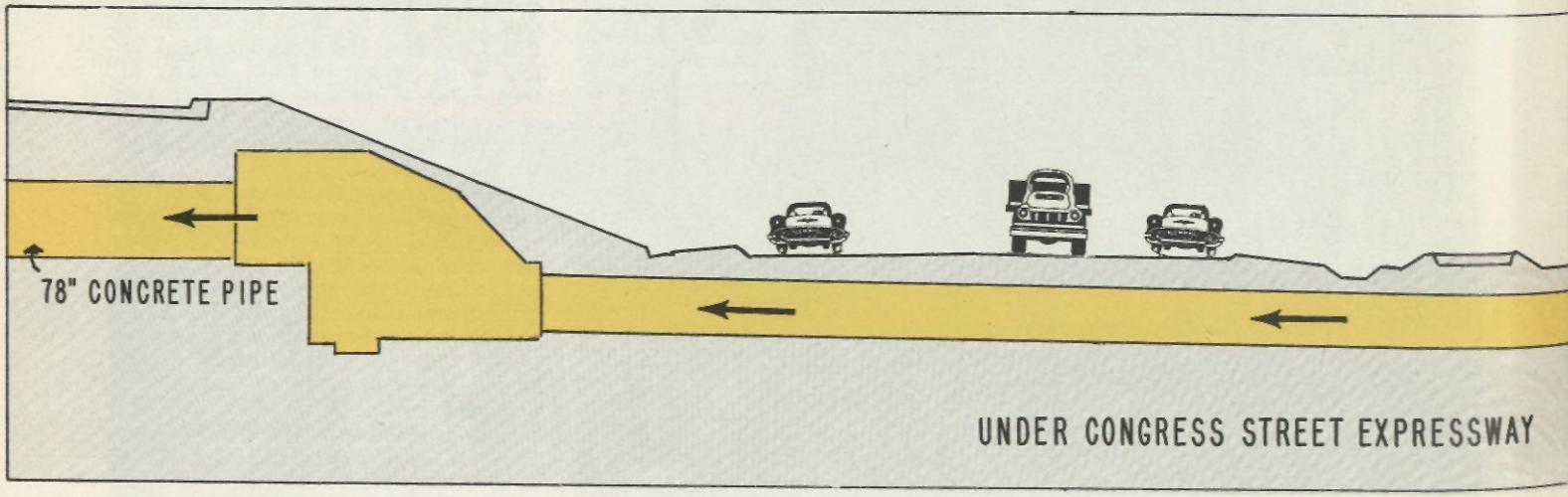


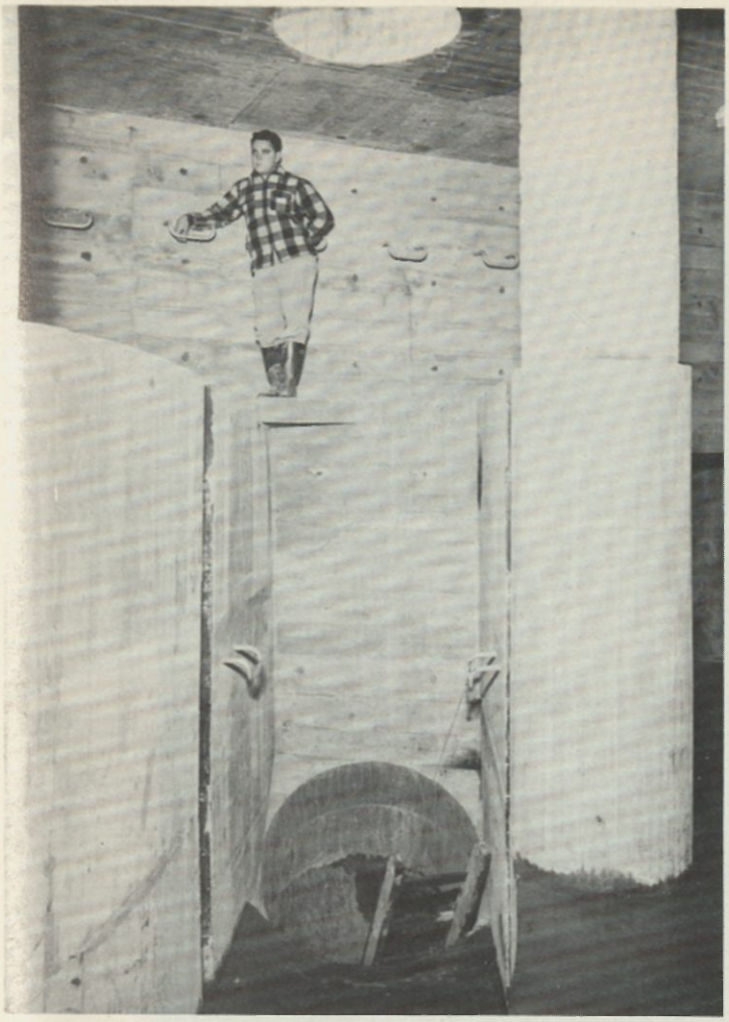
Storm water barrel in Monroe Street inverted siphon at Northwest Expressway — outlet end.



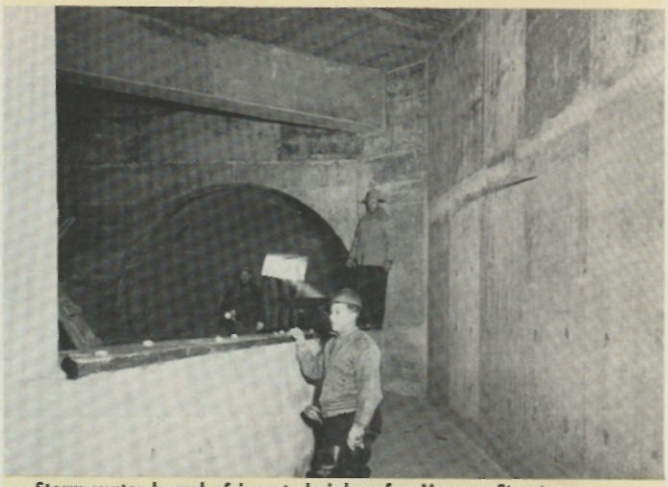
End of three-barrel siphon on Homan Avenue sewer at Congress Street Expressway.

A real siphon carries fluids *over* obstructions. An "inverted siphon" for a sewer carries them *under*. In Chicago's "combined" sewer system, dry-weather flow is only a fraction of storm flow. Therefore a pipe to carry ordinary sewage in such a siphon must be small enough to force the sewage through at enough velocity to keep the pipe clean.





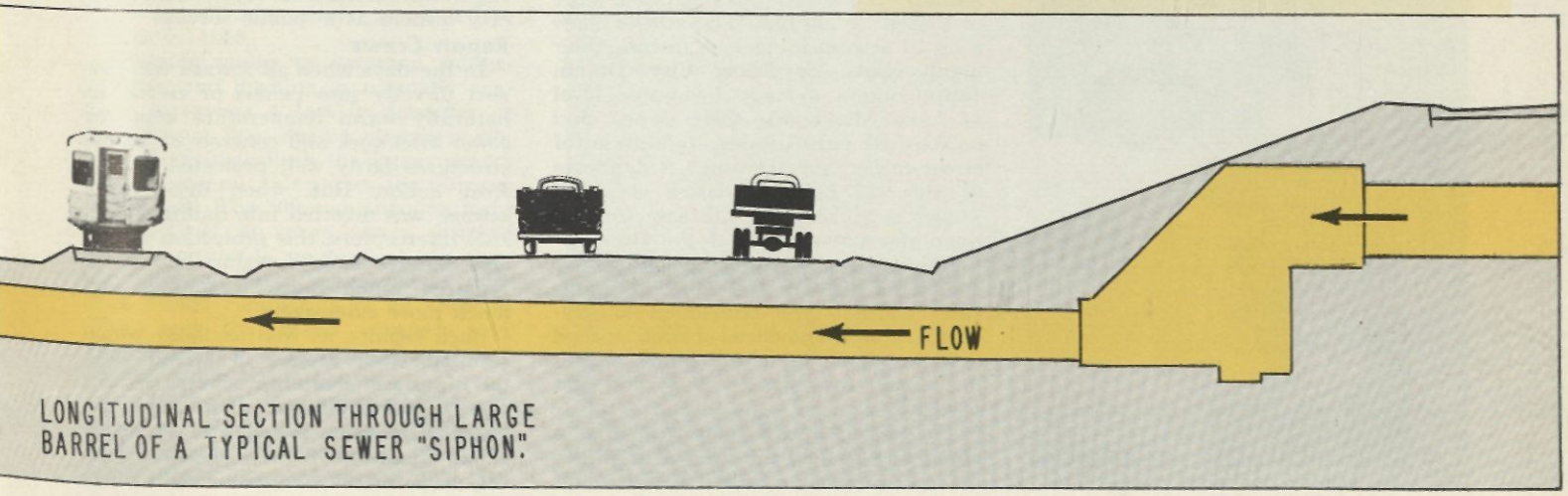
Dry weather outlet from Monroe Street inverted siphon under Northwest Expressway.



Storm water barrel of inverted siphon for Monroe Street sewer under Northwest Expressway at inlet end.

Outlet end of Monroe Street siphon at Northwest Expressway.

The storm tubes are made large enough to flow easily without backing up the water too much. If they get somewhat dirty, they are easier to clean. Dividing walls at the inlet keep the dry weather flow in its small tube but permit storm water to run over to the larger tubes on reaching certain heights.



LONGITUDINAL SECTION THROUGH LARGE BARREL OF A TYPICAL SEWER "SIPHON."

Sewer construction on Kilpatrick Avenue south of Diversey.

Repairing break in 53rd Street sewer.

Checking record of connections in Drain Atlas — Bureau of Sewers.

Keeping Records

As records of the system of City sewers, the Bureau maintains 13 atlases of 75 to 85 pages. Each atlas shows ¼ section (160 acres) per page at a scale of 1 inch = 200 feet. The atlases show sizes of sewers in feet or inches, their depth above or below City Datum (approximate average low-water level of Lake Michigan), their slopes, and established curb grades, (elevation of street curbs above Datum.) A duplicate of this set holds a record of street grades established by the City Council upon recommendation of the Bureau.

Another set of 34 atlases contains the record of sewer system connections from Chicago-type bungalows to sky-scrapers and industrial plants spread over hundreds of acres. These atlases are drawn to scales of 50 or 100 feet to the inch.

To make required plans for, and to check and post to the atlases the miles of new sewers and the thousands of new connections built every year, in addition to recording new land divisions, keeps several engineers and draftsmen busy. These atlases are consulted daily by architects, contractors, engineers, realtors, surveyors, and property owners as a public service.

Repair Crews

In the days when all sewage was carried directly into canals or rivers, its naturally warm temperature kept the sewer brickwork and concrete of outfall structures fairly well protected against frost action. But, when dry-weather sewage was diverted into Sanitary District interceptors, this protection ceased and damage from freezing had to be repaired much more frequently and much more extensively.

Such repairs, as well as those which resulted from breaks in streets over the older and shallower sewers, and repairs to manholes and catch basins, are handled by some 320 men in 36 repair gangs organized in three districts. One City-wide district comprising eight gangs

New outfall for 21st Street sewer at Canal Street.

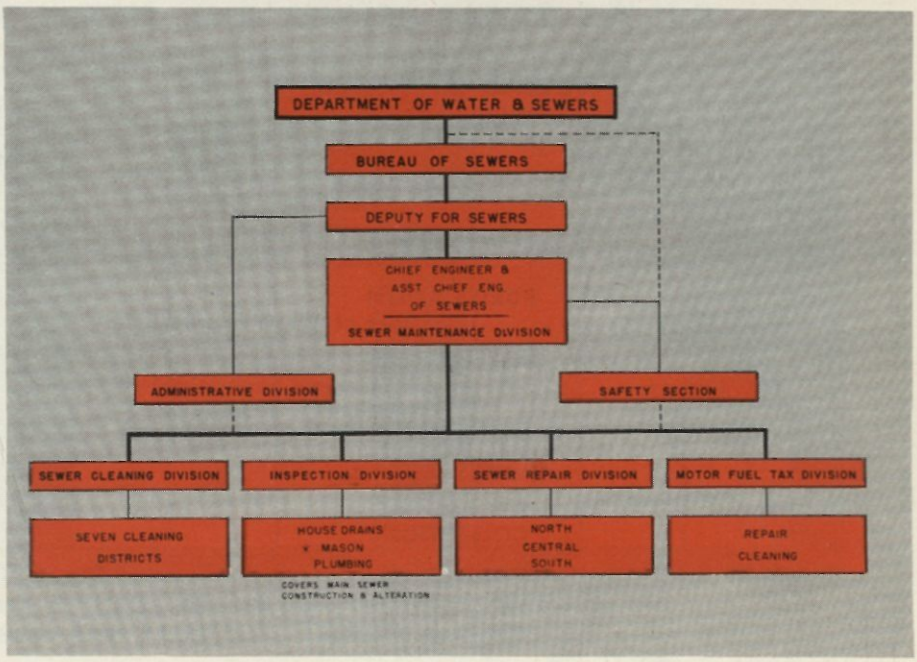
Checking for repairs to 60 year old sewer in Lawrence Avenue at North Shore channel.

works on arterial streets. The work on arterial streets is paid for from motor-fuel tax funds.

Repair jobs of all types, from those on catchbasins and manholes requiring a few bricks each, to those on large brick or concrete sewers, amounted to 19,125 in 1958.

Cleaning sewers by scraping, power-rodding, and flushing, is normally confined to sewers 4 feet in diameter or less. Heavy flow during storms is depended upon to flush the larger sewers and, in general, this serves the purpose rather well. The 500-man cleaning force is organized in seven sewer districts and a city-wide motor-fuel division. The cleaning forces responded to more than 14,400 complaints of all sorts in 1958, and the crews scraped over 4,339,000 feet of sewer and cleaned over 515,800 catch basins.

Their efforts were an important contribution to making Chicago's sewer system work effectively and serve the public well.



ADMINISTRATION AND FUNCTION

DEPARTMENT OF WATER AND SEWERS

James W. Jardine.....Commissioner of Water and Sewers

Raymond D. Johnsos.....Administrative Engineer

The Department of Water and Sewers is divided into two major units — the Bureau of Water and the Bureau of Sewers.

The Bureau of Water provides water supply to all of Chicago and 57 suburbs, and bills and collects water charges for this service. The Bureau is composed of a Pumping Station Operation Division which operates 4 water intake cribs and 11 pumping stations to pump the water into the system; the Water Purification Division, which supervises treatment of the water to insure its safety and palatability; the Water Distribution Division, which plans, constructs and maintains the water mains to transport the water from the pumping stations to the user's faucet; the Meter Division, which maintains and checks the accuracy of the meters that measure the amount of water used by the consumers; and the Collection Division, which bills, collects and accounts for water charges.

BUREAU OF WATER

W. W. DeBerard.....Deputy Commissioner for Water and Chief Water Engineer
H. H. Gerstein.....Assistant Chief Water Engineer
J. A. Elger.....General Secretary

PUMPING

J. L. Weeks.....Engineer of Water Pumping

PURIFICATION

J. R. Baylis.....Engineer of Water Purification

DISTRIBUTION

J. T. Garrity.....General Superintendent
T. F. Foley.....Assistant General Superintendent
E. Edelstein.....Engineer

METERING

M. I. Sheridan.....Superintendent

COLLECTION

J. J. Ellicott.....Superintendent

BUREAU OF SEWERS

Thomas D. Garry.....Deputy Commissioner for Sewers
William J. Cullerton.....Asst. to Deputy Commissioner for Sewers
Arthur E. Cook.....Administrative Assistant
A. J. Schafmayer.....Chief Engineer of Sewers

INSPECTION

Harry M. Forrey.....Asst. Chief Engineer of Sewers

DISTRICT REPAIR

Joseph Rostenkowski.....Superintendent

DISTRICT CLEANING

John Kilroe.....Superintendent

CONSTRUCTION

Ralph McNamara.....Superintendent
Nicholas Popovic.....Superintendent

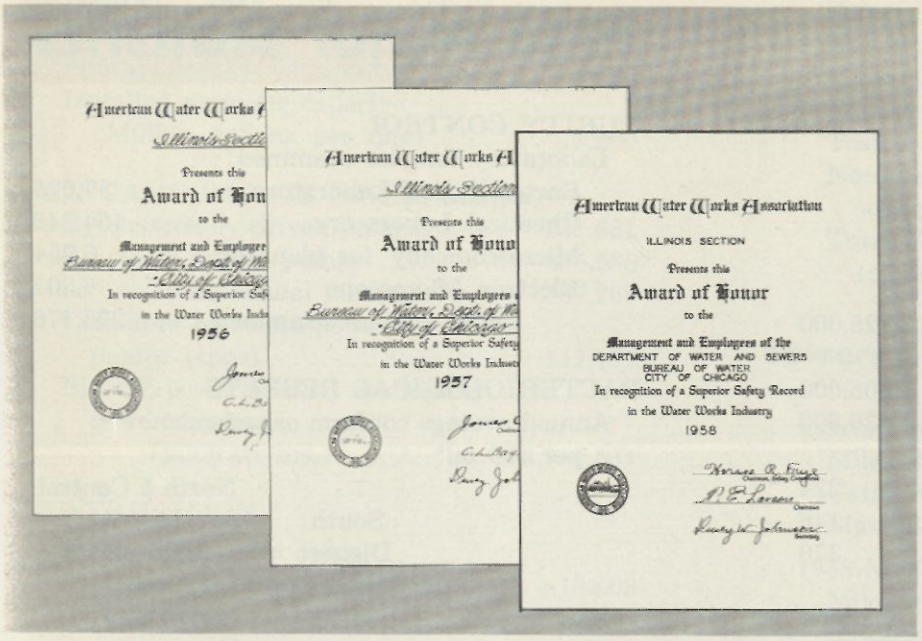
ENGINEERING

Tenney S. Ford.....Engineer
Charles E. Benson.....Engineer
David Goldberg.....Engineer

ARTERIAL REPAIR AND CLEANING

Edward Gill.....Superintendent

The Bureau of Sewers operates and maintains some 3,706 miles of public sewers. The Bureau is composed of an Engineering Division that plans and designs sewer repairs and extensions; a Cleaning Division, that flushes and scrapes sewers and cleans catch basins on a district basis; a Repair Division, that makes repairs to the sewer system on a district basis; a Motor Fuel Tax Division, that does both repair and cleaning work on arterial highway sewers and an Inspection Division, that supervises construction and installation of connections.



SAFETY AND METHODS

Personal safety equipment is an economy. Note helmets, safety glasses and foot guards.

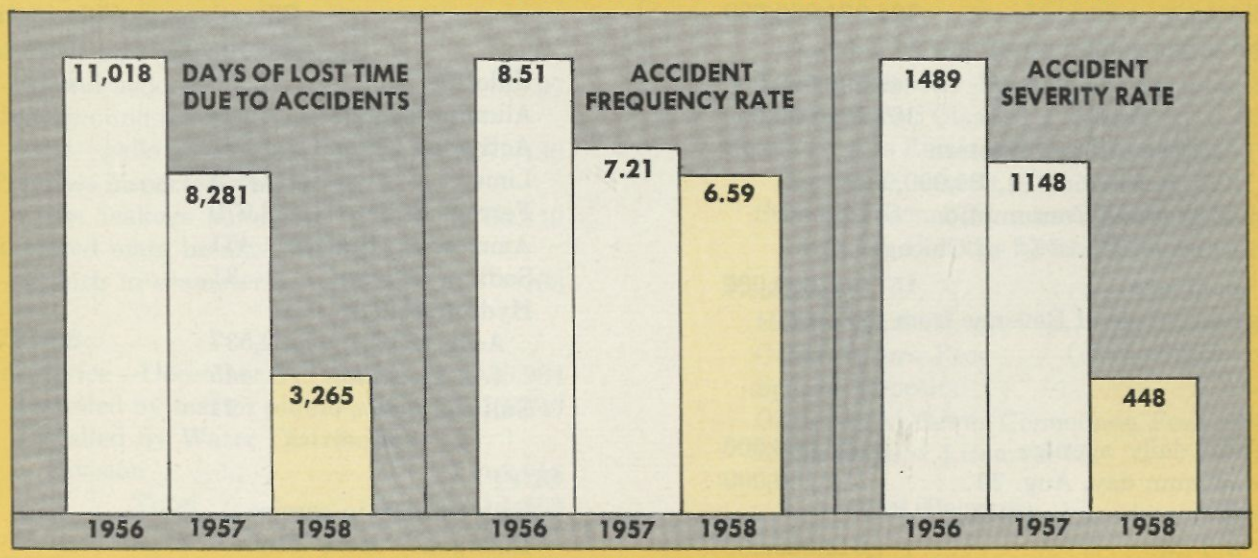
Work accidents increase operating costs. Employee time lost due to injuries from work accidents cannot be recovered. Work accidents cause individual pain, inconvenience and expense. Work accidents can be prevented by using safe work procedures.

These are the thoughts that underlie the Department's intensive promotion of rules and regulations governing safe work practices in all activities, and the insistence by all supervisors that employees be safety conscious and work safely to protect themselves, their fellow employees and the public from injuries and property damage due to work accidents.

That the implementation of the Department Safety Program is accomplishing its purpose is borne out by the data compiled from our meticulous accident reporting system. Each new year brings lower frequency and severity rates, and over the past five years these rates for the Department have been consistently below the national averages reported for U. S. Water Utilities by the National Safety Council, of which this Department is a member. In 1958, as it did in 1956 and 1957, the Department received an Award of Honor from the American Water Works Association in recognition of its superior safety record in water works operation.

The Operating Methods staff continued effectively to evaluate organization practices and work methods in the various activities of the Department and to prepare detailed manuals of approved standard operating practices. In 1958, the staff introduced a revised technique in the preparation of these manuals, using photographic reproductions to illustrate the approved step-by-step description of the work processes.

DEPARTMENT OF WATER AND SEWERS SAFETY RECORD



NATIONAL AVERAGE FOR WATER UTILITIES IN 1957
FREQUENCY RATE 15.60 SEVERITY RATE 732

1958 Major Statistics

Water . . .

POPULATION AND AREA SERVED
(Based on reliable estimates)
Population supplied:
Chicago 3,825,000
Suburban (Year-end census as revised) 805,000
Total 4,630,000
Area served (in square miles):
Chicago 224
Fifty-seven suburbs 146
Total 370

PER CAPITA CONSUMPTION

	Gallons Per Day
Chicago	234
Suburban	137
Average	217

CHEMICAL AND PHYSICAL QUALITIES OF WATER
Total hardness (as parts per million Calcium Carbonate) 132
Water temperatures: Intake (Denver Crib)
Average ..... 45.7°F.
Maximum ..... 70.0°F.
Minimum ..... 32.0°F.

PUMPAGE

Annual	Gallons
Chicago	326,971,000,000
Suburban communities and industries (metered)	40,298,000,000
Total*	367,269,000,000

*(Amount through Western Ave. Reservoir . . . 1,609,000,000)
Annual Metered Consumption in Chicago (48.13%† of Chicago pumpage) 157,368,000,000
†(Percentage of Revenue from metered rates 81.11%)

Daily
Total daily average 1,006,216,000
Maximum day, Aug. 29 1,311,140,000
Maximum hour (rate) Aug. 14 3 P.M. 1,614,000,000
Daily Average—Chicago 895,811,000
Daily average—suburban 110,405,000

PURITY CONTROL
Laboratory samples examined:
Bacteriological Laboratory 37,075
Chemical Laboratory 154,846
Microscopically for plankton 6,954
Electron Microscope 6,301
Total samples examined 205,176

BACTERIOLOGICAL RESULTS
Annual average coliform organisms per 100 ml*

	South District (filtered)	North & Central District (chlorinated only)
Raw	63.10	14.10
Plant outlet	0.001	——
Pumping stations	0.005	0.128
Distribution system	0.006	0.238

*(U.S. Public Health Service standard for safe drinking water permits a maximum average of 1.0 coliform organisms per 100 ml.)

PURIFICATION TREATMENT

	Gallons
Complete Filtration Treatment	127,678,900,000
Chlorination Treatment only	242,834,000,000

CHEMICALS APPLIED—TONS

	Filtration Treatment	Chlorination Only
Chlorine	1,086	1,220
Aluminum Sulfate	4,206	——
Activated Carbon	1,381	——
Lime	1,825	——
Ferrous Sulfate	2,670	——
Ammonium Sulfate	431	——
Sodium Silicate	31	——
Hydrofluosilicic Acid (23%)	2,537	3,578
(As Flourine)	445	707
Sulfuric Acid	11	——

SUPPLY
Crib intakes in service 4
Emergency shore intake 1
Miles of water supply tunnels under lake and land (6 to 16 feet in diameter) 63.1

PUMPING—1958

Pumping stations	11
Pumps available for service	50
Installed pumping capacity (Million gallons per day)	2,600

ANNUAL PUMPAGE (Million Gallons)

By electrically driven pumps	131,631
By steam driven pumps	235,638
Total annual pumpage	367,269
Coal used by steam powered pumps (tons)	142,137
Electric power used by electrically powered pumps. (kilowatt hrs.)	64,919,531

DISTRIBUTION

Water Mains: (in miles)	
In use—December 31, 1958	4,135.08
Extended	30.37
Abandoned	9.88
Net addition to system	20.49
Diameter of pipe (inches)	1 to 54
Fire Hydrants:	
In use—December 31, 1958	45,072
Installed	1,144
Abandoned	1,019
Net Increase	125
Gate Valves:	
In use—December 31, 1958	43,151
Installed	457
Abandoned	151
Net Increase	306
Pressure range in mains (lb. per square inch)	25-50
Average pressure at curb (lb. per square inch)	40
Miles of pipe tested for underground leakage	118.97
Underground main leakage stopped 1958—gallons per day	11,675,430
Premises inspected—house to house leakage survey	30,319
Repaired main breaks—4 inch to 42 inch in diameter	168

METERS:

In service—December 31, 1958	145,904
Installed by master plumbers	1,647
Installed by Water Distribution Division	2,916
Total	4,563
Removed	1,393
Net increase	3,170
Repaired on premises	15,842
Repaired in shops	16,242
Tested	26,503
Non-metered (assessed rate) services	347,611
Total Services (assessed & metered)	493,515

Sewers . . .

Existing Sewer System:

Miles of Sewers	3,706.79
Catch Basins	195,892
Manholes	134,662

1958 New Sewer Construction:

Miles of Sewers—all sizes	50.3
Catch Basins	1,798
Manholes	1,442

Of the above, 5.7 miles of various sizes of sewers, 43 catch basins and 208 manholes were constructed by Bureau of Sewers work forces.

Inspections	214,568
Complaints Handled	14,430

Repairs:

Total Number of Sewer System Repair Jobs Completed	19,125
Main Sewer Breaks	530
Catch Basins	13,312
Manholes	4,932
Gutter Grates and Basin Outlets	351

Cleaning:

Dirt Removed in Cleaning Operations —Cubic Yards	227,586
Sewers Scraped—Feet	4,339,339
Catch Basins Cleaned	515,881
Street Grades Established and Approved by City Council	165
Standard Bench Monuments and Ordinary Benches Established	29

Receipts:

House Drain Permit Fees	$142,965
Other Permit Fees	30,474
Special Deposits	48,537
Out-of-town Sewer Connection Fees	61,004
Drain Layers' License Fees	29,150
Total Receipts	$312,130

Supplements covering complete 1958 water or sewer statistics are available upon request.

ACCOUNTING

Modern Utility Type Accounting System for the Water Fund

A system of accounts on a modern utility basis has been established in the Department for the Water Fund in conformity with the uniform system of accounts for water companies as recommended by the National Association of Railroad and Utility Commissioners. The installation of this accounting system is a major step forward in the modernization of the fiscal practices of the Water Fund and provides for a more realistic and accurate analysis of the financial transactions of the Fund operating as a utility. Financial statements, on a utility basis, will be published in the 1958 supplement to this report and these statements will be coordinated with the Departmental statements in the City Comptroller's report for 1958. The City Comptroller maintains accounts of the Department's revenues and disbursements on a municipal basis as prescribed by law. The Department, therefore, maintains a dual system of accounts, one on a utility basis and the other on a municipal basis in order to satisfy the requirements of the accounting systems prescribed for both the utility and the municipality. Maintenance of the Water Fund system of accounts on a utility basis is of major importance in the establishment of a sound financial structure for the Fund and in placing it in a good position to borrow the funds necessary to finance the extensive Capital Improvement Program for the water works system planned for the years immediately ahead. The Water Fund is a self-supporting fund and must pay from its revenues the entire costs of maintenance and operation as well as the debt service on its borrowings.

REVENUES

% of Total		
96.5	Water bills paid	$39,851,749
.2	Fees for new service outlets	71,698
.9	Steam furnished to City and County	358,744
1.0	Interest received from deposits and investments	432,056
.2	Interest and premium on sale of certificates	65,267
.1	Sale of land	55,017
1.1	Rents and miscellaneous	453,761
	Total revenue	$41,288,292

EXPENDITURES FOR OPERATION AND DEBT SERVICE

% of Total		
	Total revenue	$41,288,292
48.0	Cost of operations	$19,836,745
21.8	Repairs and maintenance	8,984,162
.2	Judgments	73,082
11.4	Redemption of certificates	4,700,000
8.5	Interest on certificates and judgments	3,513,823
—	Refunds on assessments	15,849
	Total	$37,123,661
10.1	Balance of current revenue	$ 4,164,631
	Balance from prior years to January 1, 1958	9,734,735
	Plus: Collections of accounts receivable previously written off	285,712
	Adjustment of prior years' construction	423,600
	Adjustment of prior years' expense	16,523
	Adjustment of prior years' revenue	80,995
	Transfer of funds from Advance Engineering—Filtration Plants	337,220
	Sub-total	$15,043,416
	Less: Accounts receivable written off	213,109
	Increase in reserve set up for Water Pipe Extension Certificates	72,268
		$ 285,377
	Available for capital expenditures and Debt Service Reserve	$14,758,039
	Capital improvements from Revenue in 1958	4,995
	Debt Service Reserve at 12/31/58	8,212,000
		$ 8,216,995
	December 31, 1958 balance available for capital expenditures and Debt Service Reserve	$ 6,541,044

WATER WORKS CERTIFICATES OF INDEBTEDNESS

Balance 1/1/58	$18,382,347
Certificates issued in 1958	25,000,000
Add: Miscellaneous income	7,774
Refund due to adjustments of prior years' expense	847,323
	$44,237,444
Construction and improvements	$32,465,104
Adjustment of prior years' revenues	95,666
Balance 12/31/58	$11,676,674

OTHER CASH ACCOUNT

Cash reserve for redemption of Water Pipe Extension Certificates	$ 288,998

1958 EXPENDITURES FOR WATER WORKS CAPITAL IMPROVEMENTS

Water Works Construction	Source of Funds Water Certificates
Water mains	$ 4,253,653
Filtration (Central)	11,039,628
Filtration (Central) tunnel	5,446,324
Tunnel — 79th Street	7,041,600
Pumping stations and miscellaneous	4,683,899
	$32,465,104

The above tabulation represents a preliminary financial summary of the Water Fund. Final financial statements will be included in the City Comptroller's report for 1958.

COLLECTION

Collection Division Produces Water Bills By Machine on Post Cards

Another step forward that has been completed is the installation of a modern electronic machine punched card system in the Collection Division. During 1958 some 490,700 assessed rate and metered rate accounts were billed under this new machine process on punched cards ready for mailing to customers. This system has simplified the accounting procedures of the Collection Division and provided quicker and more accurate billings to the customers of the Chicago Water Works System.

Two Important Steps

The importance of these two steps in the modernization of the accounting and billing practices of the Department is readily realized when one considers that the Water Collection Division collected a total of $39,851,749 in water charges during 1958.

Rates charged users for water furnished by the Chicago Water Works System compare very favorably with those charged in most large cities in the country and are lower than many. The good financial reputation of the Water Fund will be maintained in the years immediately ahead even though an unusually extensive Capital Improvement Program will be accomplished.

TO THE ENDS OF THE EARTH

Chicago's water works and sewer systems hold unique places among the water supply and drainage systems of the world. It is not, therefore, surprising that the universal need for pure water and adequate drainage in 1958 attracted delegations of administrators, engineers and scientists from many nations to see the Chicago systems in operation. These groups have interested themselves in the management, engineering, design, maintenance and research activities of one of the country's best-known water and sewer facilities.

Through the portals of the South District Filtration Plant, the plumbing laboratory, the administrative offices, passed hydraulic engineers and foreign dignitaries of all faiths, all races, all political persuasions. Signing their names into the Chicago record book were engineers from Australia, Germany, Russia, Spain, Peru, Japan, India, Thailand, Italy, South Korea, Panama, Cuba, Canada, the West Indies Federation, France, Brazil, Kenya, and the Union of South Africa.

Engineers from Tokyo were interested in Chicago's underground leak-detection program as so many of that city's water mains were broken during air raids in World War Two. Engineers from Spain were furnished with blueprints of the Central District Filtration Plant. A guest from Kenya asked for assistance in plumbing design. And countless others came, specifically, to confer with Chicago engineers on water works and sewer system operating problems and the latest developments in water purity research and sewer design.

Most gratifying to the employees of the Department of Water and Sewers, however, were the thousands of Chicagoans — school children, educators, civic leaders, and other interested citizens — who came to see their water works and sewer systems in operation. Department personnel were pleased to speak before groups or to provide them with Annual Reports or special brochures describing the operations of the two systems.

The Chicago Department of Water and Sewers, a public utility for public service, is proud to be of help.

1958 ANNUAL REPORT DEPARTMENT OF WATER & SEWERS CITY OF CHICAGO